HOW TO BUILD
FAMOUS PLANES
IN MINIATURE

- HOW TO OBTAIN REAL FINISH • HISTORY
- PLANE PLANS • USES OF SOLID MODELS
- AIRPLANE INSIGNIA • AERODYNAMICS
- FLYING TERMS • BUILDING PROCEDURE

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Acknowledgement is made and credit given to the Bureau of Aeronautics, U. S. Navy; The U. S. Office of Education, Federal Security Agency; and The National Advisory Committee for Aeronautics for material used herein. Without their authorities on several subjects this booklet would be inadequate.

FOREWORD

It's a wise hobby you've chosen, building model airplanes—a hobby with a brilliant future. The air is the world highway of tomorrow . . . the airplane is ready to play its most spectacular role. All this awaits the dawn of peace. Then will come a new era . . . "The World of the Air".

Thousands upon thousands of pilots, mechanics and designers will be called upon to make the limitless dream of aeronautics a miraculous reality. You may well qualify for an important position . . . with a bright future.

It is no idle boast that "today's model builders are tomorrow's men of the air". The war has already proved this beyond a doubt. Consider the achievements of many of our greatest pilots, bombardiers and navigators who at one time built model planes. That hobby taught them the fundamentals of aeronautics, thus giving them a sound basis for all additional knowledge acquired at Army and Navy training schools. Many former model builders rank high, too, among our best instructors and mechanics.

Model aircraft also serves a purpose of its own. The Army and Navy are using model planes to teach aircraft identification. Every "war bird" first saw a Messerschmitt 109 or Mitsubishi 96 modeled to scale. Aerial gunners, too, learn invaluable lessons of target ranges, thanks to these model planes. Even civilian spotters were instructed in this manner.

In the same vein, skilled and unskilled workers in our great aircraft plants were first taught to build parts for airplane models. This plan proved to be the most effective approach to the "real thing", as well as the least costly in time and money.

Thus, while you enjoy working on the models you select, you're getting an ideal preparatory training and gaining priceless experience to take your place in the near-future world of aviation. Even if your plans do not point in that direction, your reward lies in the new-found skill of your busy hands, in the increased capacity to solve your problems from a more technical approach, in the satisfaction you'll get from your finished model and in the praise you'll win from your admiring friends.

Yes, in every respect, building famous planes in miniature is truly a hobby with a future. Nothing can halt the brilliant future of aeronautics . . . your place in "The World of the Air" depends on *you*.

Photo Courtesy Air Trails

★ *Airmen stationed at Mitchell Field involuntarily glance towards the ceiling where scale solid models of allied and enemy aircraft are displayed. These models are constant reminders of the shape and size of the planes these men will soon meet above foreign battlegrounds. This scene could be repeated at every spot where airmen gather, for models are in view at all fields.*

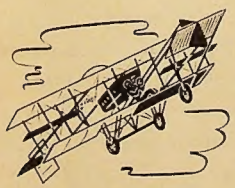
★ ★ ★ ★ A SHORT HISTORY

We Americans like to think that aviation had its beginning in 1903 when Orville and Wilbur Wright invented and flew a flimsy contraption for 12 seconds for a distance of 120 feet! Kittyhawk, North Carolina saw this phenomenon and publicized it thru the newspapers of the world. There have been controversies ever since, as to who first flew a powered plane. Of course gliders had carried men aloft as early as 1100 A. D. when Saracen of Constantinople was killed in an attempt to fly with his robe spread out and stiffened by rods. He actually took off but "stalled" in flight and crashed.

Six years from the time the Wright plane first flew, a plane with the Frenchman Bleriot at the controls spanned the English Channel in less than one half hour. Two years after this, in 1911, the first U. S. transcontinental flight occurred! It took 49 days, yet that was only eight years after the first American plane had flown.

Sixteen years after Kittyhawk a transatlantic adventure from Newfoundland to the Azores to Spain and then to England was carried out by a Navy plane, the NC-4. Before this, such names as Spad, Fokker, Camel and Nieuport were making history in World War I, when their pilots threw bricks and dropped bombs by hand, when rifles were fired from planes and machine guns would shoot off their own propeller blades by mistake. More of the factual information on some of these planes can be found elsewhere in this booklet.

The American public took a generous amount of time to become "air-conscious," for though the war had come and gone, stunt flying continued without causing much public excitement. Yet in 1924 a mass flight by the U. S. Army of 27,500 miles around the world made headlines, as did a flight up and over the North Pole by Richard E. Byrd and Floyd Bennett.



But America must have been waiting for May 21, 1927. On that day a young man named Charles Augustus Lindbergh, in a carefully planned, well navigated flight, arrived in Paris from New York after 33½ hours of

sleepless solo flying. For many months our newsmen lauded the youth who had conquered the Atlantic. This young man made more history three years later when he flew from Los Angeles to New York making only one stop. Nineteen years before it had taken 49 days to do just that. Lindbergh flew it in 15 hours. In the same year Amelia Earhart set a new women's speed record of 181 M.P.H.

In 1933 Wiley Post caused the world to grow almost visibly smaller when he circled it in less than eight days. Then in 1934 an Italian made his seaplane speed at the unbelievable rate of 440 M.P.H.

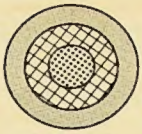
In 1936 air traffic was progressing, with the transporting of freight and passengers rapidly becoming an accepted practice. In that year the China Clipper, a huge Pan American seaplane, made its first flight from San Francisco to Manila.

Finally, in 1938, Douglas "Wrong-way" Corrigan, in a nine year old, poorly-equipped "crate" flew from New York to Ireland after he had been refused permission to proceed. This spectacular flight won him popular acclaim. Within a year, the first transatlantic mail was being flown by a Yankee Clipper to France by way of the Azores and Portugal. This venture ended temporarily when the German Luftwaffe began its vicious attacks on the various capitols of Europe.

Despite all this, the war has immeasurably hastened the progress of flight. In the postwar period, such names as Messerschmitt and Focke-Wulf, Spitfire and Hurricane, Thunderbolt and Lightning, Liberator and Fortress, Lancaster and Sterling, yes and Mitsubishi and Condor will turn their efforts to smooth an effortless flight around a tiny world, carrying their people and their cargoes in friendly commerce. The airplane will come into its own, proving its constructive worth in peace just as it has proved its destructive force in war.

ALLIED NATIONS' INSIGNIA

BRAZIL


BOLIVIA

CHILE

COLOMBIA

CUBA

ECUADOR

HONDURAS

PERU

URUGUAY

UNITED STATES

VENEZUELA

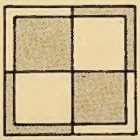
MEXICO

CHINA

NETHERLANDS

FRANCE

GREAT BRITAIN
AUSTRALIA
CANADA
NEW ZEALAND
SOUTH AFRICA


POLAND

NORWAY

RUSSIA

Aerodynamics— A QUICK LOOK.

Aerodynamics is nothing more or less than the study of the dynamics of the atmosphere upon a moving shape. Strangely enough, an airplane flies because of its shape and not because of a powerful engine or propeller of great size. The wing does the job. It has a slightly curved depression on the lower surfaces and a high arch on its top sections. Prototype wings are either flat or convex on the lower surface. A cross section of a wing will show these curves. A cross section is what you would see should you cut a piece of the wing off and look at the two stub ends. Engineers, draftsmen and designers have found that this is the most successful shape and have scientifically and accurately designed various versions of it.

The wing is set so that its bottom surface deflects the air it meets downwards. An old law of physics proves that the air reacts and pushes the wing upwards. At the same time air being forced over the curve of the wing's top surface creates a vacuum and tries to suck surrounding air downward. That same law of action and reaction tells you that in return the wing gets sucked upward . . . and this suction, more than anything else, lifts the wing. Now in order for the wing to keep meeting the air so that this phenomenon might continue to occur, the wing must be pulled. A propeller is used for this. A propeller's cross section is very much like a wing's cross section. It has the same curves on a smaller scale. Place two, three, or four of these small wings around a hub, spin the hub by means of an engine, mount the propeller wings vertically instead of horizontally and they will push and pull the air just like big wings. But instead of up and down, the small push will be backwards and the great pull will be forward.

Now all of this would be futile unless the wing and propeller were doing some good, like carrying persons or freight. So we must place a man to control the wing and propeller in the direction he chooses. We place him in the fuselage We fasten the wing to the fuselage, place the engine in this same fuselage. Next, we enclose a cockpit within the fuselage so that the pilot can see where he is going. Then we place smaller control

wings at the rear in order to steer and balance the fuselage, and we put wheels on the bottom to keep the plane from crashing on takeoffs and landings.

The wheels are of no use in flight, so they may be tucked away where they won't impede the speed of the plane. The fuselage is smoothed and gracefully curved as much as possible also to reduce drag. Since all of these protuberances tend to drag the plane back and slow it up, a flying wing would, therefore, be the ideal construction.

Air has a strange tendency to clutch and drag at a fuselage. We cannot see air and so it remains somewhat of a mystery to us. We feel it, however, and call it wind. We heat our homes by heating the air . We preserve our foods by cooling the air in a refrigerator. Air has a thickness, a very real density which covers the earth and becomes thinner the farther away it is from the earth. When a plane is built to fly high, it must charge its engines with extra air in order to feed them, and the plane must travel fast in order to meet as much air as possible. Cargo planes and planes that fly long distances often have long thin wings which will meet a great amount of air over a land surface but will meet it more gently, thus saving gas. A smaller, more maneuverable plane usually has shorter, stubbier wings which meet air violently but can spill air quickly for sharp turns.

Thus, a pilot sits at his controls and minutely adjusts them in order to change the shape of his plane as he flies. He spills the air upwards and downwards as he wills. He steers right or left in the same way, using the basic knowledge that he has four forces to keep in balance. He knows that (1) while his engine and propeller are pulling him forward, (2) air is dragging at all the surfaces, trying to draw him backward. He also knows that (3) while his wings are pushing the air downward and air is helping to lift and suck the plane up, (4) the weight of the wheels and fuselage, the cargo and himself is pulling it down.

When he has learned to coordinate himself with these forces, he has only obeyed the simple laws of aerodynamics .

HOW TO OBTAIN *Real Finish*

The glistening sleekness of a transport as it taxis to a halt at the airport is a sight once seen, never to be forgotten. Yet modellers by the hundreds have built beautiful planes without ever approaching that highly polished appearance.

The paragraphs below seek to clarify a few points about finishing. Follow them in detail and you may expect better results, for they are the consensus of opinion from several authoritative sources.

Attempt to finish your model in a dust free, moderately warm room if possible. Damp, cool rooms retard drying processes and tend to cause "blushing". Buy the best materials you can possibly afford, for with inferior materials even a craftsman with many years of experience cannot guarantee good results. Next, keep all your equipment in good condition. Try to work without the "greenhouse", wire or thread on the plane in order to allow sanding and painting freedom.

Use No. 0000 Sandpaper or 5/0 to 7/0 grade of Garnet paper. Sand each section to satiny smoothness before starting to paint the model. It's much simpler to get a smooth paint job when the base is smooth.

Now to fill the pores in the raw wood, use a regular wood filler or apply at least two coats and probably three coats of clear dope as it comes from the bottle. Brush it on freely and allow half an hour between coats. After the last coat, allow it to dry overnight. The next step is perhaps the most important of all. It concerns sanding the model. Sand smoothly and lightly, keeping away from sharp edges as much as possible and working with the grain. Sand until you can close your eyes and feel no roughness anywhere on the plane. When all is smooth you are ready to apply color. But first brush away all sanding dust.

Thin the color down 50%, that is, use two parts of color to one coat of thinner. Remember that many thin coats are better than a few heavy coats. Your hobby dealer can suggest the best to use.

Apply three coats of color about an hour apart. After the third coat let the plane dry again for a day or two. Now it must be sanded again to remove all "air-bubbles" Use 7 0 or 8 0 wet or dry paper. Best results are obtained by dipping the paper in water and sanding The water tends to float away the minute particles of paint cut away so that the paper does not fill and become useless. Then a final coat of color, thinned down about 75% is to be brushed on. This last coat should leave a fine gloss, but for an even higher finish rub the plane lightly with rotten stone (obtainable at paint stores) and light oil on a piece of felt until a dull gloss appears over the entire model. Polish with a soft flannel cloth. Now you may attach the pilot's celluloid "greenhouse", the radio wire or thread, and perhaps the decalcomania insignia if you wish.

If you followed directions closely, this plane should be your "shining example" Strive for perfection. If a piece does not fit or look right don't be afraid to discard the part and start over. One poor fitting section or one piece of work carelessly done can spoil the entire model. Perfect models are not a matter of minutes. They take hours or maybe weeks to complete. Save money on your hobby and get more satisfaction by doing the work well.

In this booklet on the following pages are thirty-five three view drawings. They are of planes of the first World War, the quarter century of peace and of this war. They are planes of the United States, of Britain, Germany, Russia and Japan. They are all single engine planes but collectively they give a good cross-sectional picture of the aviation developments since then. Some of them are not pretty, some are beautiful in their proportions. All are interesting from the standpoint of their respective uses.

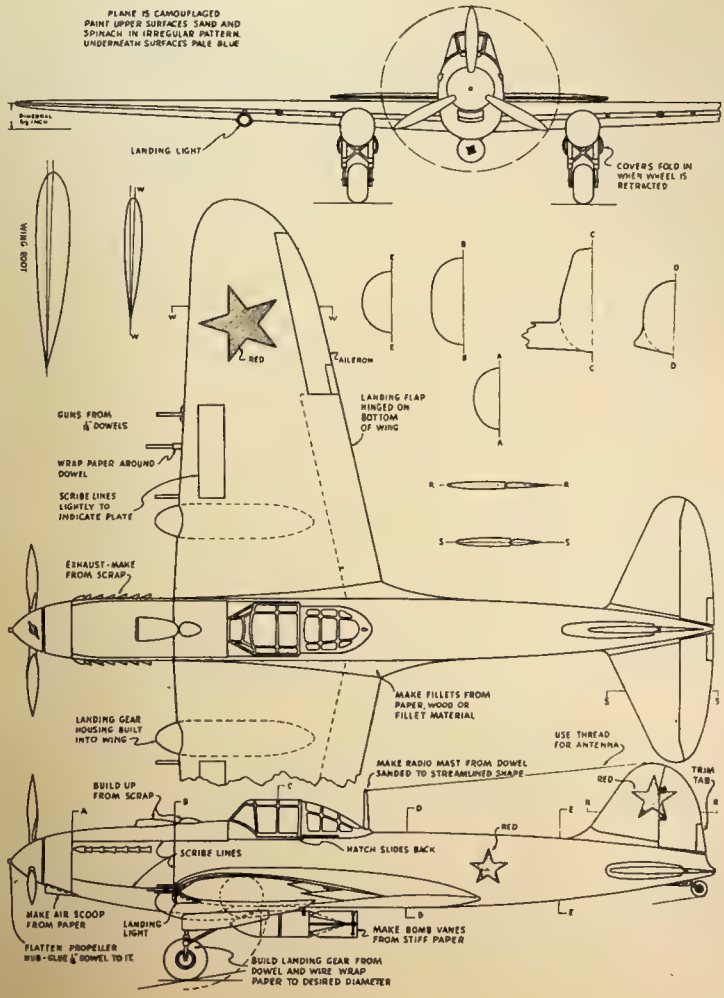
Once before these planes appeared in booklet form. At that time there was no data attached which pertained to them. In this edition we have assembled all the data which we were able to glean from extensive files. Wartime censorship and restrictions however cloud the data on some of the newer planes.

The models as shown here are reproduced to a scale of approximately one eighth inch to the foot. In a few exceptions which are noted, data was compiled from photographs and is not necessarily authentic as to dimensions. We have sought to make this section as educational as is possible.

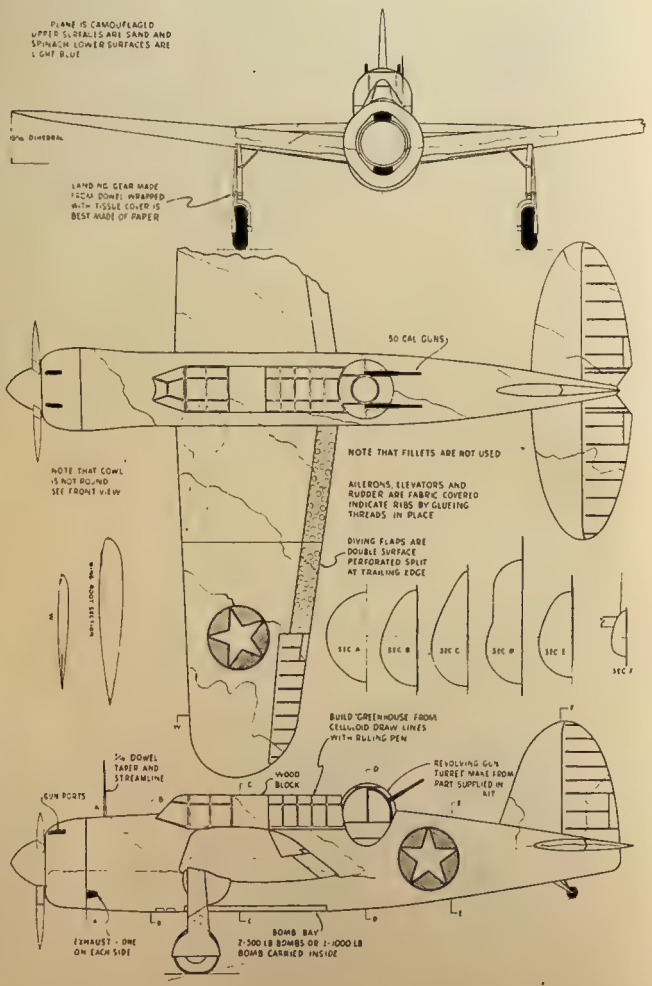
At any rate we are sure you will gain information you did not already have.

IL-2C STORMOVIK *(See page 11)*

Little is known of the planes of Japan, our enemy. Not much more is known of a great number of the planes of our ally, Russia. But among her planes the Stormovik stands in a place of its own. The plane is supposedly one of the most heavily armored fighters in the world. Perhaps it is not really a fighter, but an attack plane. Light cannon shells are rumored to deflect off her fuselage, so strong is she. The facts (all rumors) are as follows: A 1300 H. P. M-85 Toupelev engine is the power source. Top speed above 300 M. P. H. There are two 32-mm. Hispano-Suiza cannon and four machine guns of unknown caliber. It is supposed to carry either four 250 lb. rocket bombs or one 1000 pounder. All of this in a single seated plane! The Storm plane itself has a very long fuselage and is of very clean, sweeping lines. Our three views is based on photographs and other drawings and is only approximate as to dimensions, etc. The closer alliances recently revealed between the U. S. and the Soviets may glean more specific information at a later date.


PLANE IS CAMOUFLAGED
PAINT UPPER SURFACES SAND AND SPINACH IN IRREGULAR PATTERN
UNDERNEATH SURFACES PALE BLUE
LANDING LIGHT
COVERS FOLD IN WHEN WHEEL IS RETRACTED
WING ROOT
RED
AILERON
LANDING FLAP HINGED ON BOTTOM OF WING
GUNS FROM 1/4" DOWELS
WRAP PAPER AROUND DOWEL
SCRIBE LINES LIGHTLY TO INDICATE PLATE
EXHAUST-MAKE FROM SCRAP
MAKE FILLETS FROM PAPER, WOOD OR FILLET MATERIAL
LANDING GEAR HOUSING BUILT INTO WING
USE THREAD FOR ANTENNA
MAKE RADIO MAST FROM DOWEL SANDED TO STREAMLINED SHAPE
TRIM TAB
BUILD UP FROM SCRAP
SCRIBE LINES
HATCH SLIDES BACK
MAKE AIR SCOOP FROM PAPER
LANDING LIGHT
MAKE BOMB VANES FROM STIFF PAPER
FLATTEN PROPELLER HUB-GLUE 1/4" DOWEL TO IT
BUILD LANDING GEAR FROM DOWEL AND WIRE WRAP PAPER TO DESIRED DIAMETER

RUSSIAN IL-2C STORMOVIK


PLANE IS CAMOUFLAGED
UPPER SURFACES ARE SAND AND SPINACH LOWER SURFACES ARE LIGHT BLUE
10% DIHEDRAL
LANDING GEAR MADE FROM DOWEL WRAPPED WITH TISSUE COVER IS BEST MADE OF PAPER
50 CAL GUNS
NOTE THAT FILLETS ARE NOT USED
NOTE THAT COWL IS NOT ROUND SEE FRONT VIEW
AILERONS, ELEVATORS AND RUDDER ARE FABRIC COVERED INDICATE RIBS BY GLUEING THREADS IN PLACE
DIVING FLAPS ARE DOUBLE SURFACE PERFORATED SPLIT AT TRAILING EDGE
SEC A
SEC B
SEC C
SEC D
SEC E
SEC F
BUILD GREENHOUSE FROM CELLULOID DRAW LINES WITH RULING PEN
1/16 DOWEL TAPED AND STREAMLINE
WOOD BLOCK
REVOLVING GUN TURRET MADE FROM PART SUPPLIED IN KIT
GUN PORTS
EXHAUST - ONE ON EACH SIDE
BOMB BAY
2-500 LB BOMBS OR 1-1000 LB BOMB CARRIED INSIDE

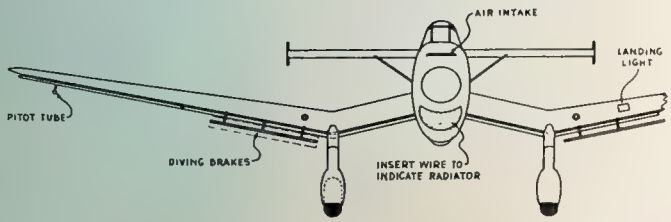
BREWSTER SB2A-1 BUCCANEER

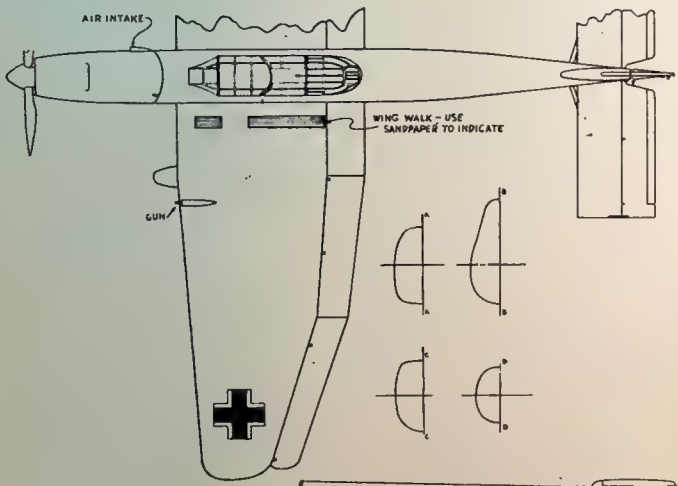
BREWSTER SB2A-1 BUCCANEER *(See page 12)*

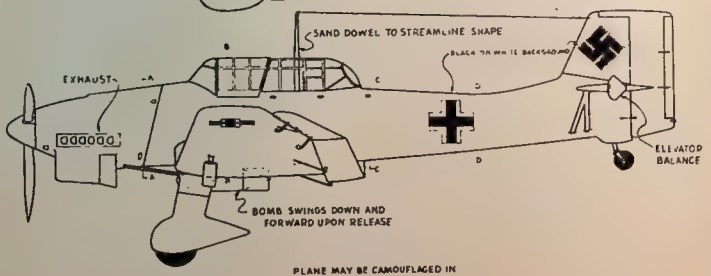
A 1,000 pound bomb or two 500 pounders are completely enclosed within the fuselage of this three seated killer until its moment of attack. Delivered at a speed variously reported at from 300 to 340 M. P. H. we find the Buccaneer to be another U. S. contribution to air power. A scout-bomber with a 1,000 mile range, it hurtles its 11,000 pounds forward because of its 1700 H. P. Wright Cyclone radial engine. Its span is 47 feet, its length almost 39 feet and it stands on its stable, wide spaced landing gear and measures 15 feet, 8 inches in height. The American Buccaneer we see here has a ball turret which fires two .30 cal. machine guns from its position forward of the tail. The British version, the Bermuda, has no turret but carries a long observation greenhouse almost to the tail fin. The Buccaneer boasts six .50 cal. machine guns, all fixed, as its frontal armament. Brewster is at present attempting to iron out production difficulties at which time Buccaneer will probably become truly famous.

JUNKERS Ju. 87B STUKA *(See page 14)*

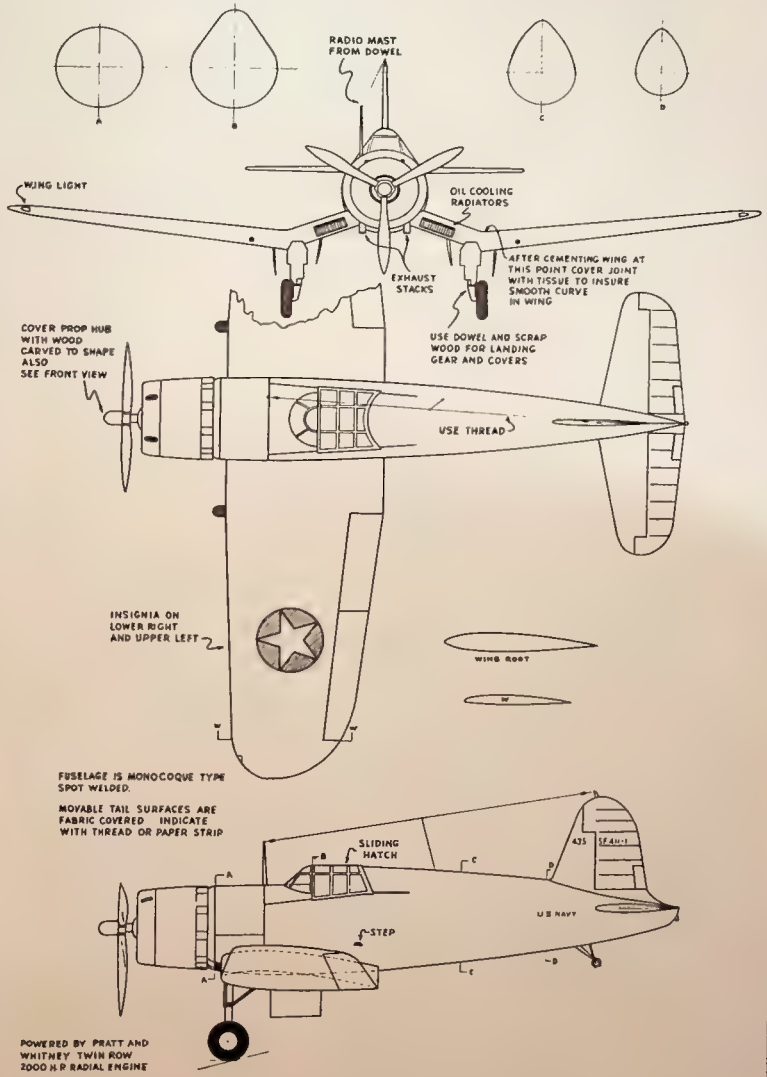
Skillful propaganda and lack of any organized resistance made this clumsy plane a dread symbol of war at its worst. It was made in great numbers by the Germans, and with its non-retractable wheels and huge diving brakes it was not pretty. Its maximum level speed was 240 M. P. H. at 13,780 feet. It ranged 500 miles at a time and landed slowly (67 M.P.H.) Span was 45 feet, 4 inches; length 35 feet, 6 inches. This dive bomber carried one 500 kg. bomb under its body and four of 50 kg's. under its wings. It had one machine gun on each wing beyond the propellers' arc, and one in the rear cockpit, firing aft. A Junkers "Jumo" 211 engine of 1000 horsepower lifted a full load of 9,300 pounds and dived its two Nazi flyers at a screaming maximum of 430 M. P. H. During the Allies' North African campaign in 1942 the Stuka became suddenly obsolete when it ran into equal or superior numbers of the finest planes England and America could possibly produce. This time the Allies were neither "too little nor too late."







PLANE MAY BE CAMOUFLAGED IN THE USUAL MANNER OR MAY BE COMPLETELY PAINTED DULL BLACK


RADIO MAST FROM DOWEL
WING LIGHT
OIL COOLING RADIATORS
EXHAUST STACKS
AFTER CEMENTING WING AT THIS POINT COVER JOINT WITH TISSUE TO INSURE SMOOTH CURVE IN WING
USE DOWEL AND SCRAP WOOD FOR LANDING GEAR AND COVERS
COVER PROP HUB WITH WOOD CARVED TO SHAPE ALSO SEE FRONT VIEW
USE THREAD
INSIGNIA ON LOWER RIGHT AND UPPER LEFT
WING ROOT
FUSELAGE IS MONOCOQUE TYPE SPOT WELDED.
MOVABLE TAIL SURFACES ARE FABRIC COVERED INDICATE WITH THREAD OR PAPER STRIP
SLIDING HATCH
435
SF 4U-1
U.S. NAVY
STEP
POWERED BY PRATT AND WHITNEY TWIN ROW 2000 H.P. RADIAL ENGINE
SPAN 40 FT 3 IN.

VOUGHT F4U-1 CORSAIR

VOUGHT F4U-1 CORSAIR

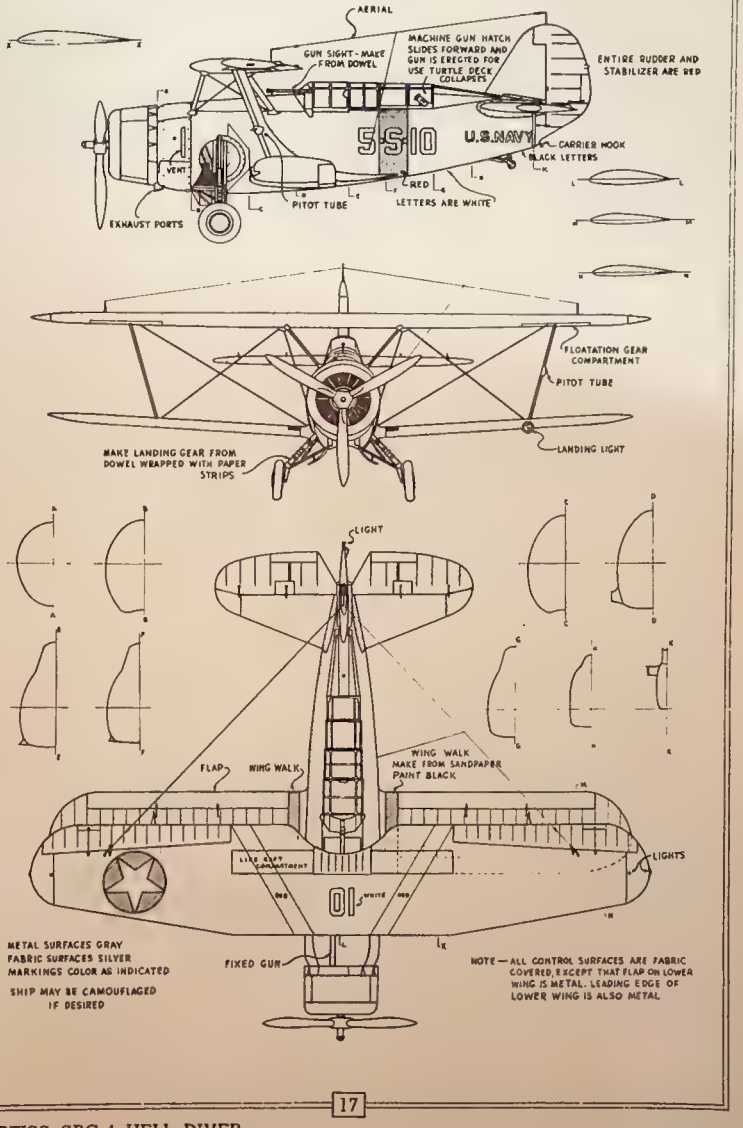
(See page 15)

Despite the veil of rigid censorship enforced during wartime it is without a doubt that until the advent of the Hellcat, the title of "most formidable navy fighter" belonged to the Corsair. This plane is very easily identified by its wing, which is an inverted gull type. The wing dips this way in order to keep the landing gear at normal length and yet allow for the huge three bladed propeller, 13 feet in diameter, with which the plane airscrews along at more than 400 M. P. H. A 2000 H. P. Pratt and Whitney Twin Wasp engine is its source of power. It seats one man who fires a secret amount of armament, probably six to eight machine guns of .50 caliber. The Corsair weighs approximately 4½ tons, reports state. Photos show that it can carry small bombs. Its length is about 30 feet, its span 40 feet 3 inches. The wing folds up its outer panels so that it can be stored conveniently on carrier duty. Its range and service ceiling are restricted. It is known to be heavily armored as are all of our new planes. The Pacific theatre of war has seen much of this powerful plane. Battle reports give it great superiority over anything the Japanese have been able to produce.

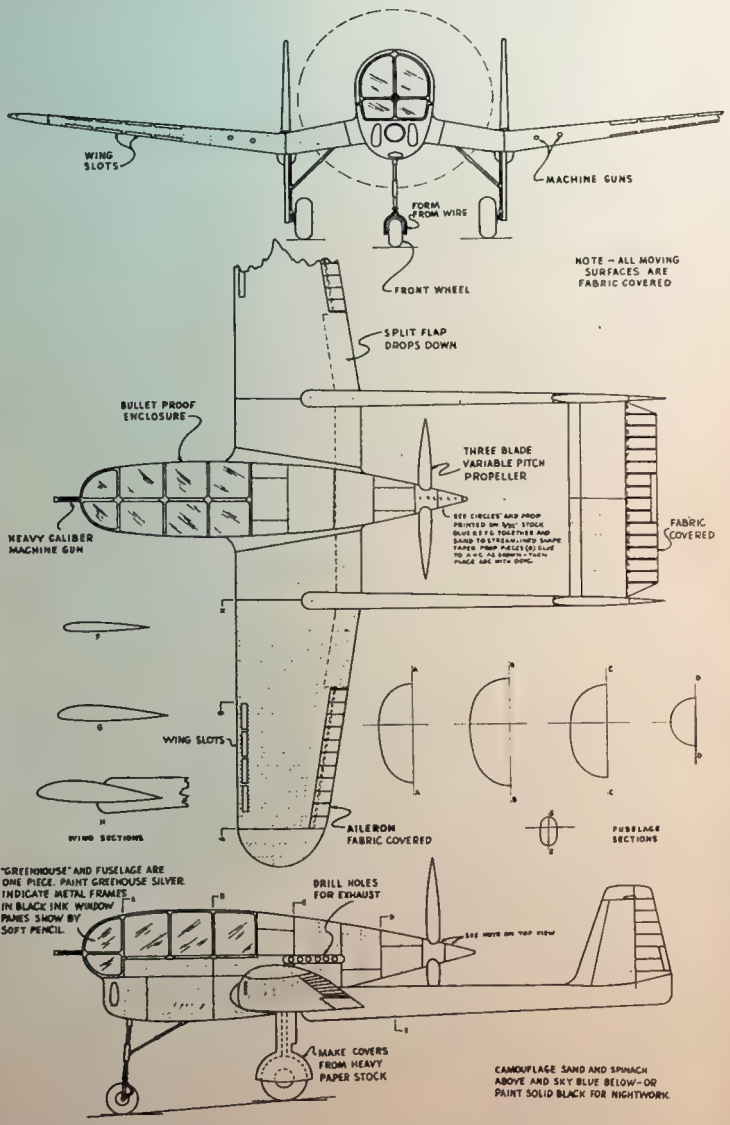
CURTISS SBC-4 HELLDIVER

(See page 17)

This particular plane is but one of the many which have used the name "Helldiver". The Navy just recently approved for release pictures of a new and deadly divebomber of that same name, which will eventually replace the divebombers which in turn superseded this model shown on the next page. It is perhaps safe to suppose that the SBC-4 will be the last of the biplane designs which our Navy will use. This deep-bodied plane was designed to be sturdy enough to withstand catapult launchings, and open sea landings. Its landing gear folded in and lay flat in openings at the sides of the fuselage, forward of the bottom wing. The wingspan (of the top wing) was 34 feet. The plane measured 28 feet, 4 inches overall length. It ranged the ocean for 855 miles at a cruising speed of 176 M. P. H. although its top speed approached, perhaps exceeded 235 M. P. H. A Wright-Cyclone radial engine of 850 horsepower turned the three bladed propeller. This two-seater carried various combinations of armament for observer and pilot consisting of .30 and .50 cal. guns. Medium and heavy bomb loads were carried beneath fuselage and wings. On observation flights an extra gas tank was suspended beneath the fuselage.



CURTISS SBC-4 HELL DIVER


WING SLOTS
MACHINE GUNS
FORM FROM WIRE
FRONT WHEEL
NOTE – ALL MOVING SURFACES ARE FABRIC COVERED
SPLIT FLAP DROPS DOWN
BULLET PROOF ENCLOSURE
THREE BLADE VARIABLE PITCH PROPELLER
HEAVY CALIBER MACHINE GUN
FABRIC COVERED
WING SLOTS
AILERON FABRIC COVERED
WING SECTIONS
FUSELAGE SECTIONS
"GREENHOUSE" AND FUSELAGE ARE ONE PIECE. PAINT GREENHOUSE SILVER. INDICATE METAL FRAMES IN BLACK INK WINDOW PANES SHOW BY SOFT PENCIL
DRILL HOLES FOR EXHAUST
MAKE COVERS FROM HEAVY PAPER STOCK
CAMOUFLAGE SAND AND SPINACH ABOVE AND SKY BLUE BELOW – OR PAINT SOLID BLACK FOR NIGHTWORK

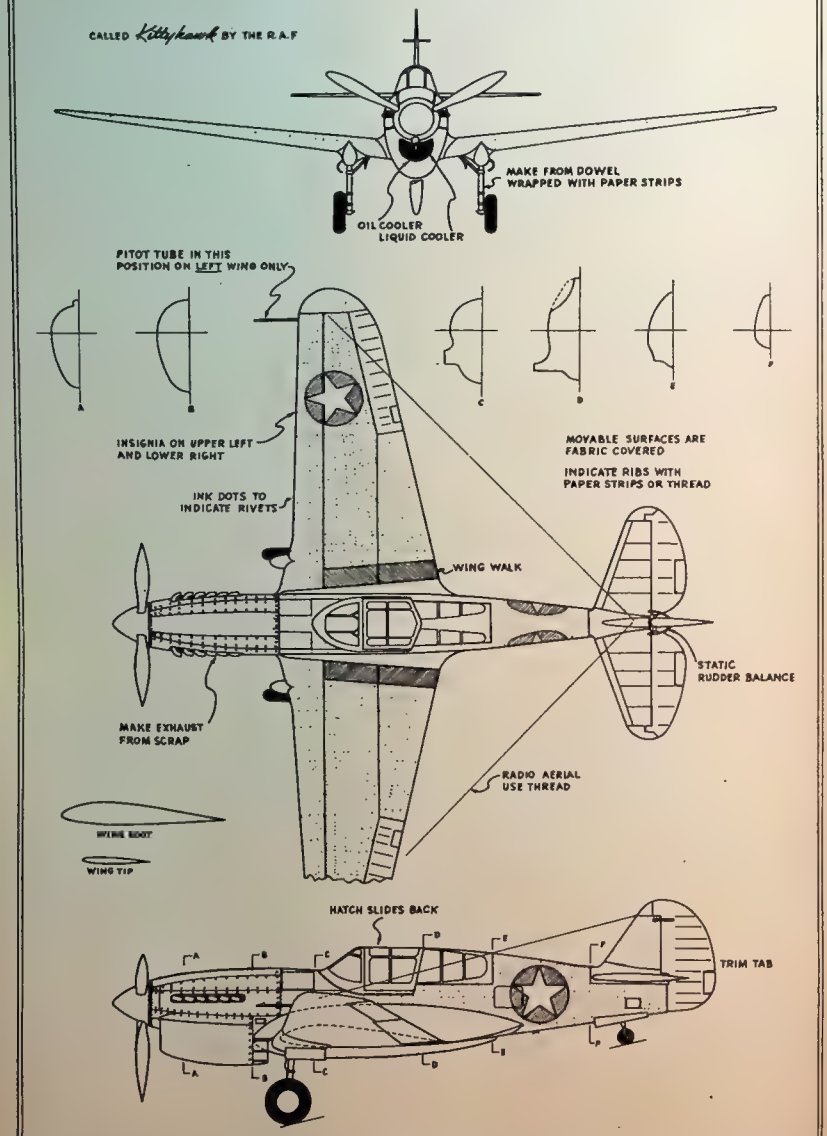
FOCKE-WULF Fw. 198

FOCKE-WULF Fw. 198 *(See page 18)*

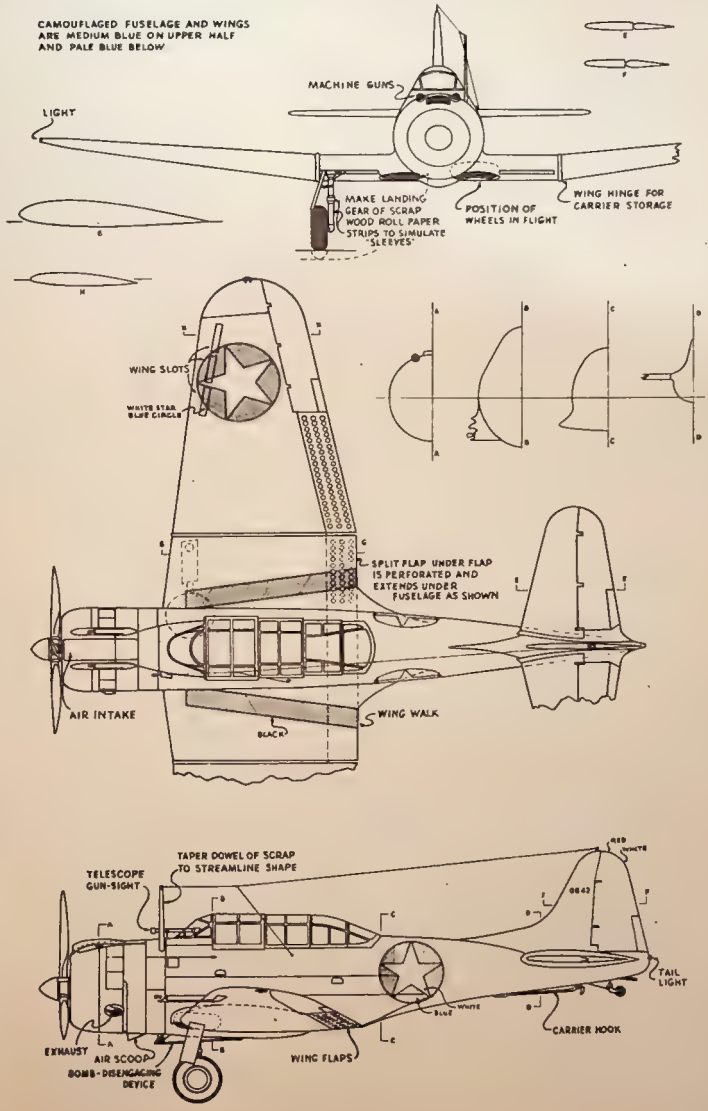
This strange single seater fighter plane developed by the Germans resembles at first our own much more deadly "Lightning". Yet this plane has but one engine, which is a pusher at that. It has a span of 41 feet against the Lightnings' span of more than 52 feet. Its length is 31 feet, 6 inches, gross weight 7,188 pounds. The Mercedes-Benz 1175 H. P. or 1375 H. P. engine drives the propeller by means of a 4 foot, 6 inch shaft. This experimental model has a tricycle landing gear, with main wheels folding inwardly and nose wheel folding backwardly. Its armament varies as follows: 2 cannons in wings and four machine guns in the nose of the nacelle; or single cannon in the nacelle with four machine guns in the wings; or again with four 20-mm. cannons and two 13-mm. or 15-mm. heavy machine guns. Its service ceiling is high (34,500 feet), cruising range approaches closely to 600 miles. Its sea level speed is 324 M. P. H. Its maximum speed comes at about 19,000 feet when it moves along at 368 M. P. H.

CURTISS P-40F WARHAWK *(See page 20)*

This army pursuit plane and its predecessors have come up for a great deal of unfair criticism probably due to the fact that when we entered the war the P-40's were used in every theatre of the war, fighting at all altitudes, but incidentally always holding the field till the specialty models came along. The P-40F shown here maintains a good reputation however. While its performance characteristics are not positive, we'll list what we have found. A Rolls-Royce Merlin engine developing 1300 H. P. drives the plane at a top speed of 370 M. P. H. with altitude ceiling of 30,000 feet. Its range is 767 miles. The Warhawk is armed with three .50 cal. machine guns in each wing, and a bomb load can be carried as well. The Warhawk has a span of 37 feet, length 33 feet and a height of 10 feet, 7 inches. This plane has the armor-plate, leak-proof fuel tanks, radio, and equipment of all first-line United States fighters. Its combat box scores will probably be as high at the end of the war as they were at the beginning.



CURTISS P-40F WARHAWK


CAMOUFLAGED FUSELAGE AND WINGS ARE MEDIUM BLUE ON UPPER HALF AND PALE BLUE BELOW
MACHINE GUNS
LIGHT
MAKE LANDING GEAR OF SCRAP WOOD ROLL PAPER STRIPS TO SIMULATE "SLEEVES"
POSITION OF WHEELS IN FLIGHT
WING HINGE FOR CARRIER STORAGE
WING SLOTS
WHITE STAR BLUE CIRCLE
SPLIT FLAP UNDER FLAP IS PERFORATED AND EXTENDS UNDER FUSELAGE AS SHOWN
AIR INTAKE
WING WALK
BLACK
TAPER DOWEL OF SCRAP TO STREAMLINE SHAPE
TELESCOPE GUN-SIGHT
TAIL LIGHT
CARRIER HOOK
EXHAUST
AIR SCOOP
BOMB-DISENGAGING DEVICE
WING FLAPS

DOUGLAS SBD-3 DAUNTLESS

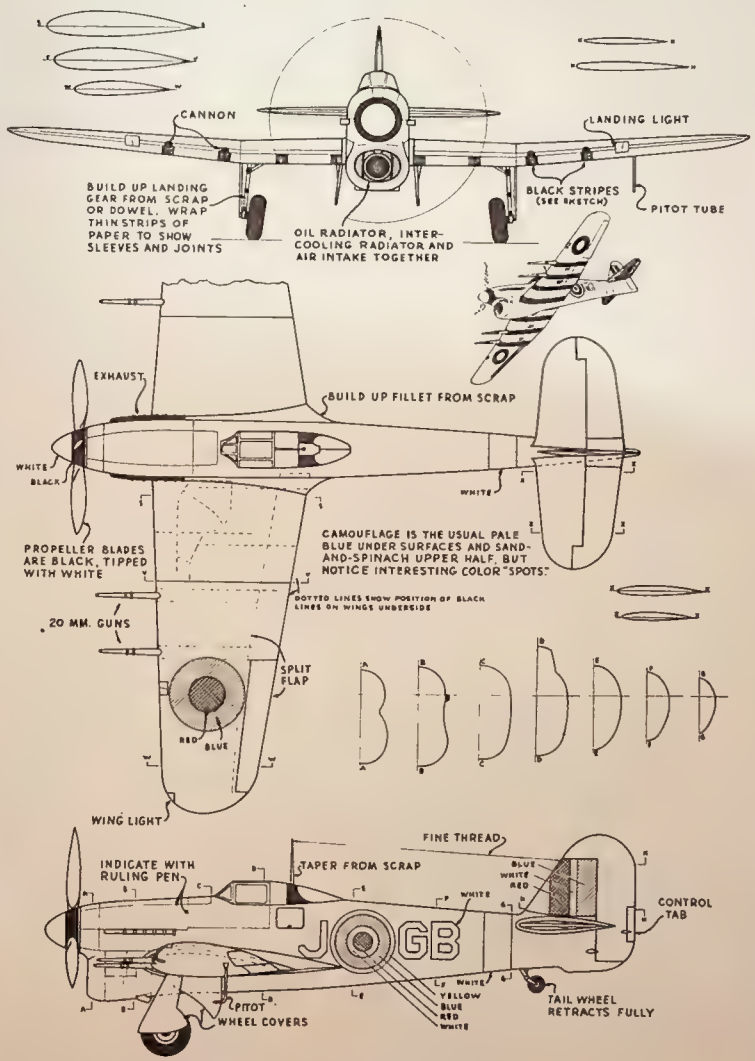
(See Page 21)

Officially listed as a dive bomber or a scout plane it has different performance characteristics for each. As a bomber its range is 520 miles, as a scout range is 1,100 miles. Maximum speed at 16,000 feet for the bomber is 246 M. P. H.; the scout 257 M. P. H. Cruising speed for the bomber is 209 M. P. H.; the scout 220 M. P. H. service ceiling, bomber is 26,800 feet; scout is 28,900 feet. The engine in either case is a Wright "Cyclone" 950 H. P. job. The Japs can testify as to this plane's capabilities as a dive bomber. Armament consists of machine guns and bomb racks, exact details not being released for publication. Probably .30 cal or .50 cal. machine guns fire through the propeller. A 500 pound bomb is probably attached under the fuselage with bomb racks on the wings. Wing span is 41 feet, 6 inches; length 31 feet, 8 inches. The wheels are fully retractable, hydraulically operated, and it has a swiveling tail wheel. This two place carrier plane has a stalling speed of 72.5 M. P. H. which makes it very effective in its Pacific dive-bombing missions. It has a special bomb-disengaging device under the fuselage which swings the bomb clear of the propeller arc, during the moment of release.

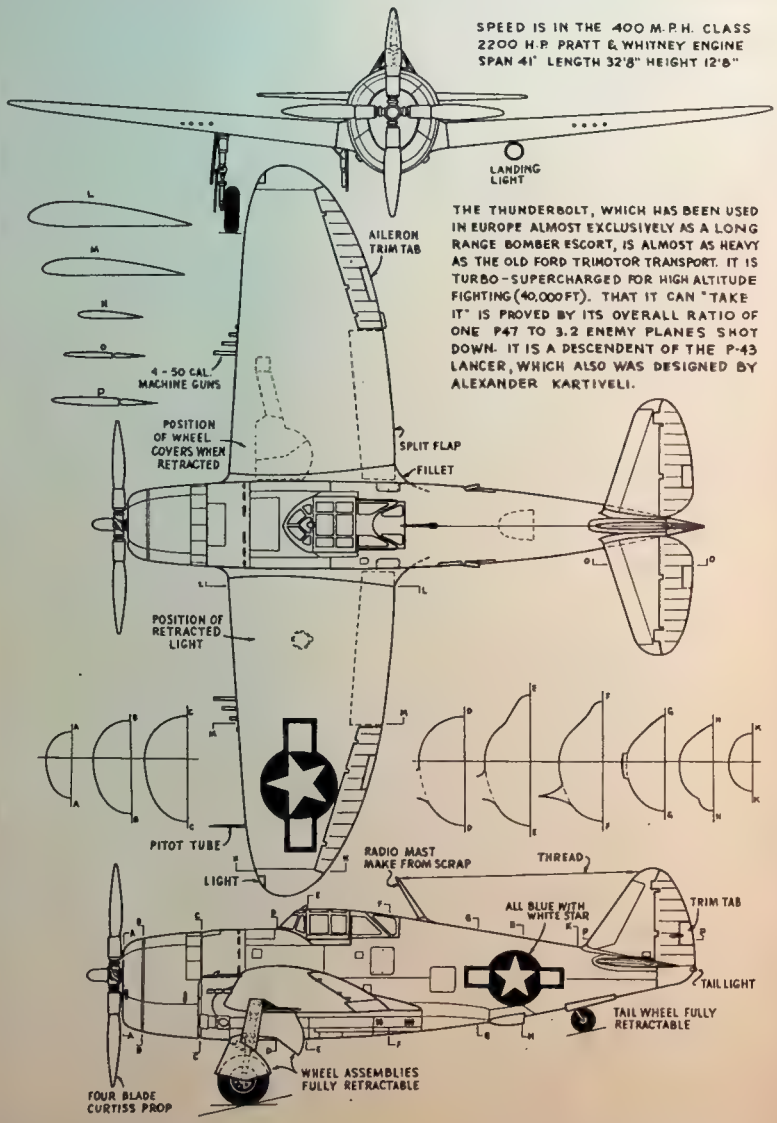
HAWKER 1B TYPHOON

(See page 23)

Among the latest fighter designs produced by the British is this deep-chested, single engined, single seated fighter. Many features of its design are still secret. No secret however, is its size. It is the largest English fighter being built, spanning 40 feet, with an overall length of almost 32 feet. Its oil radiator, intercooling radiator and air intake are located as a group beneath the engine, which accounts for its fuselage depth. Bizarre striping of the undersides of the wing and imaginative use of white paint lends further "dash" to the design. A 24 cylinder liquid-cooled Napier-Sabre engine is the power plant. The 1B model sports four 20-mm. Hispano-Suiza cannons. A 1A version carries twelve .303 Cal. Browning Machine Guns. This armament makes the Typhoon one of the most heavily armed planes in the fighter class. The wide-set landing gear retracts inward into the wings. The tail wheel also is fully retractable. Unofficial sources give this huge fighter plane a maximum speed rating of well over four hundred miles per hour. Range and altitude still are among the restricted items along with loaded weight and instrument spectifications.



A 24 CYLINDER LIQUID-COOLED NAPIER-SABRE ENGINE POWERS THIS BIGGEST OF ENGLISH FIGHTER PLANES. HISPANO-SUIZA 20 MM. CANNONS MAKE IT A KILLER AS DOES A 400+MPH SPEED. THIS IS THE 1B. THERE IS A 1A VERSION WITH TWELVE .303 BROWNING MACHINE GUNS MOUNTED


SPEED IS IN THE 400 M.P.H. CLASS
2200 H.P. PRATT & WHITNEY ENGINE
SPAN 41' LENGTH 32'8" HEIGHT 12'8"
LANDING LIGHT
THE THUNDERBOLT, WHICH HAS BEEN USED IN EUROPE ALMOST EXCLUSIVELY AS A LONG RANGE BOMBER ESCORT, IS ALMOST AS HEAVY AS THE OLD FORD TRIMOTOR TRANSPORT. IT IS TURBO-SUPERCHARGED FOR HIGH ALTITUDE FIGHTING (40,000 FT). THAT IT CAN "TAKE IT" IS PROVED BY ITS OVERALL RATIO OF ONE P47 TO 3.2 ENEMY PLANES SHOT DOWN. IT IS A DESCENDENT OF THE P-43 LANCER, WHICH ALSO WAS DESIGNED BY ALEXANDER KARTIVELI.
AILERON TRIM TAB
4 - 50 CAL MACHINE GUNS
POSITION OF WHEEL COVERS WHEN RETRACTED
SPLIT FLAP
FILLET
POSITION OF RETRACTED LIGHT
PITOT TUBE
LIGHT
RADIO MAST MAKE FROM SCRAP
THREAD
ALL BLUE WITH WHITE STAR
TRIM TAB
TAIL LIGHT
TAIL WHEEL FULLY RETRACTABLE
WHEEL ASSEMBLIES FULLY RETRACTABLE
FOUR BLADE CURTISS PROP

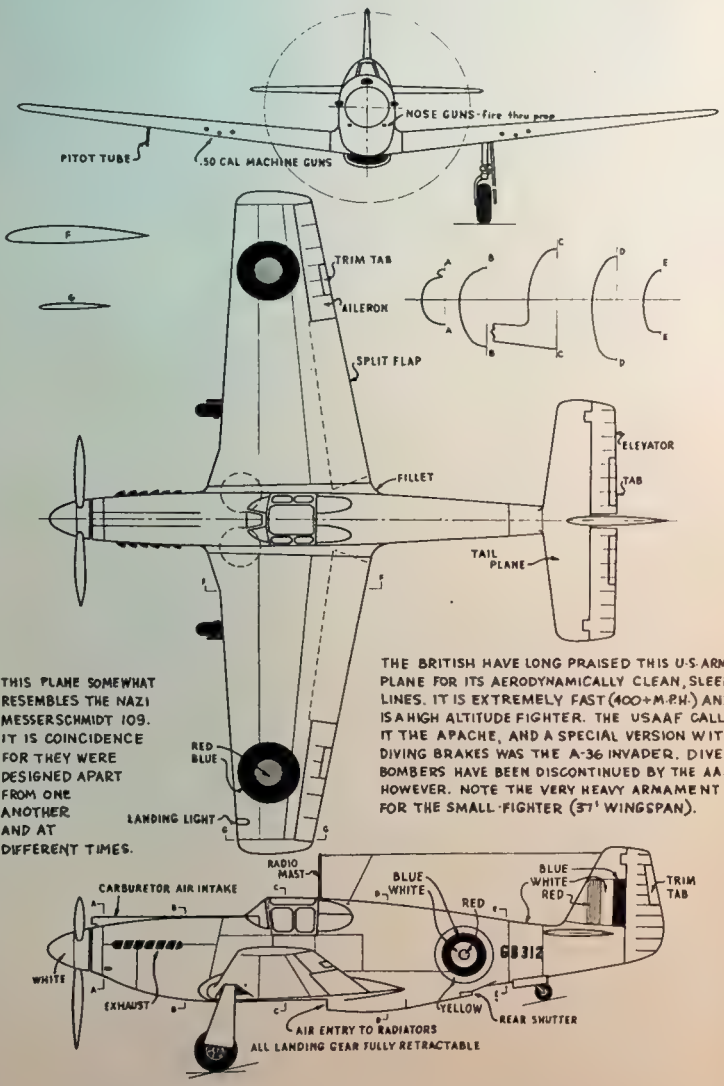
REPUBLIC P-47B THUNDERBOLT

REPUBLIC P-47B THUNDERBOLT *(See page 24)*

The Thunderbolt has so far never discovered its flight ceiling, but it has flown only as high as human endurance has let it. It contains a 2000 H. P. Pratt and Whitney Double Wasp engine which is aided by a turbo-supercharger. Together they spin the 12 foot four bladed propeller which pulls the plane at better than 400 M. P. H. speed. In tests it dived at 725 M. P. H. and a few rumors give it a diving speed approaching or bettering that of sound. Its eight .50 cal. fixed machine guns weigh a ton. It carries another ton of gasoline and its loaded weight is greater than that of the old trimotor transports. Yet it is a single seated interceptor-fighter. It has a span of 41 feet, its length measures 32 feet, 8 inches, its height 12 feet, 8 inches, its weight empty is 13,500 pounds. It is used by the U. S. as a long range escort fighter where it combines with the Lightning in enabling our heavy bombers to reach their destinations in occupied Europe, and to bring them back after precision bombing is done.

NORTH AMERICAN P-51 "MUSTANG" *(See page 26)*

This single place fighter was the popular No. 1 fighter with both English and American flyers in 1943. Even later versions with Rolls-Royce Merlin engine and supercharger bid well to make this the greatest high altitude fighter of all time. It had used a 1150 H. P. Allison when this three view was drawn, and had a top speed of 370 M. P. H. It was a scout fighter used in low altitude work. Now it doubles as attack plane and high altitude fighter. As an attack plane, designated the A-36, it is equipped with diving flaps and earns the name "Invader". Span is listed as 37 feet, length is 32 feet. It was designed and the first plane built from scratch in 100 days! Its armament consists of six wing guns of .50 caliber and has two nose guns. Armament probably varies in the different versions, but if it does the information is restricted. The latest models' speed is rated "above 400 miles per hour". Gross weight is 7,700 pounds. It has fully retractable landing gear, and steerable tail wheel. The "Mustang", or "Apache" is built for both the AAF and the RAF. At present writing an even newer, "hotter" model is rumored to be in the near-production stage. Details as to performance, armament, etc. are of course restricted.



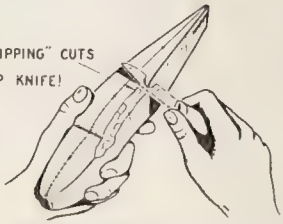
THIS PLANE SOMEWHAT RESEMBLES THE NAZI MESSERSCHMIDT 109. IT IS COINCIDENCE FOR THEY WERE DESIGNED APART FROM ONE ANOTHER AND AT DIFFERENT TIMES.

THE BRITISH HAVE LONG PRAISED THIS U.S. ARMY PLANE FOR ITS AERODYNAMICALLY CLEAN, SLEEK LINES. IT IS EXTREMELY FAST (400+M.P.H.) AND IS A HIGH ALTITUDE FIGHTER. THE USAAF CALLS IT THE APACHE, AND A SPECIAL VERSION WITH DIVING BRAKES WAS THE A-36 INVADER. DIVE-BOMBERS HAVE BEEN DISCONTINUED BY THE AAF HOWEVER. NOTE THE VERY HEAVY ARMAMENT FOR THE SMALL-FIGHTER (37' WINGSPAN).

NORTH AMERICAN P-51 "MUSTANG"

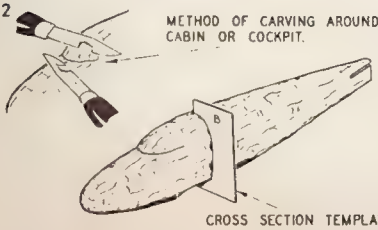
BUILDING PROCEDURE FOR SOLID MODELS

1



BEGIN CARVING TO GENERAL SHAPE AS SHOWN BY CROSS SECTION TEMPLATES AND FINAL ASSEMBLY DRAWING.

2

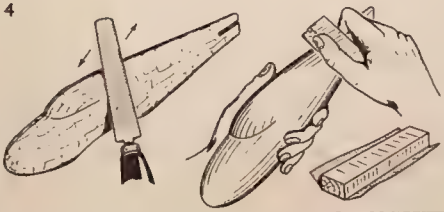


CARVE FUSELAGE CLOSE TO TEMPLATE SHAPES BUT A LITTLE OVERSIZE TO ALLOW FOR SAND-PAPERING. DO NOT CARVE AWAY CENTER LINE DRAWN ON TOP AND BOTTOM OF FUSELAGE.

3

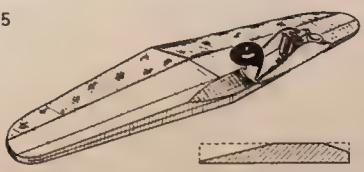
AROUND COCKPITS, ON BOTTOM OF FLOATS, AND WHEREVER CONCAVE CUTS HAVE TO BE MADE, USE KNIFE WITH EDGE PARALLEL TO WOOD GRAIN. CHECK WITH CROSS SECTION TEMPLATES FREQUENTLY.

4



USE RASP OR ROUGH SANDPAPER WRAPPED AROUND A SMALL BLOCK TO REMOVE BUMPS. THEN SAND SMOOTH WITH FINE SANDPAPER.

5

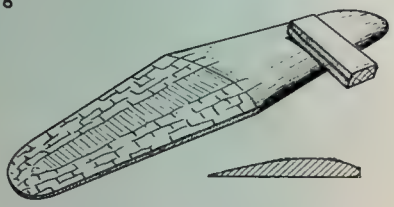


CUT BLOCK DOWN TO GUIDE LINES WITH KNIFE OR PLANE. LEAVE TRAILING EDGE AT LEAST 1/32" THICK.

★ ★ ★ ★ ★ ★

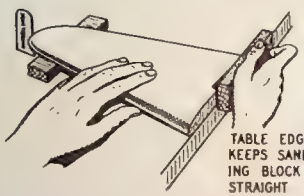
BUILDING PROCEDURE FOR SO

6



TRIM DOWN AND SAND TO FIT WING AIRFOIL TEMPLATE. ROUND OFF LEADING EDGE.

7

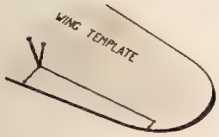


CUT WING APART AT DIHEDRAL BREAKS AND BEVEL EDGES AS SHOWN ABOVE.

8

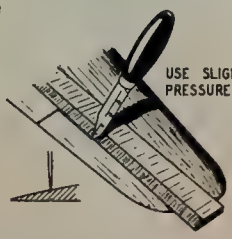
GLUE PIECES TOGETHER AND BLOCK UP WING TIPS USING DIHEDRAL GAUGE. USE WAX PAPER BENEATH GLUE JOINTS TO PREVENT STICKING TO TABLE.

9



PUSH PIN THRU TEMPLATE TO MARK CONTROL SURFACES.

10



SCORE INTO SURFACE WITH KNIFE USING PINHOLES AND STRAIGHT EDGE AS A GUIDE.

11
12
13

CARVE DOWEL TO APPROXIMATE SHAPE.

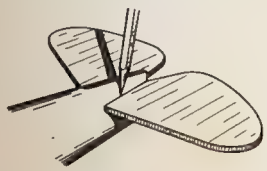
SANDPAPER DOWEL. USE TWISTING MOTION.

CUT OFF SPINNER WITH SAW.

16

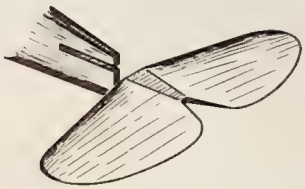
17

14



CUT OUT STABILIZER AND SLIP IN FUSELAGE SLOT. DRAW LINES ON TOP AND BOTTOM OF STABILIZER AS SHOWN.

18

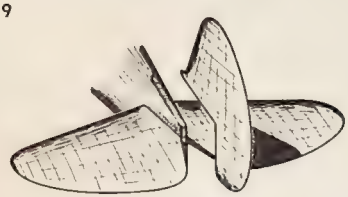


GLUE ELEVATOR TO FUSELAGE. MAKE CERTAIN THAT IT IS LINED UP WITH WING.

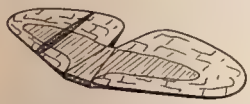
15

DRAW CENTER LINE AROUND ENTIRE EDGE OF STABILIZER.

19



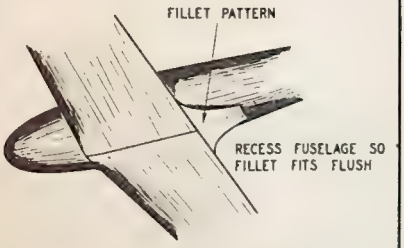
GLUE RUDDER OR RUDDERS IN PLACE. CHECK ALIGNMENT CAREFULLY.



PE STABILIZER APPROXIMATELY AS WN ABOVE. ON SMALL MODELS, POR- I THAT FITS INTO FUSELAGE IS T SQUARE.

ID STABILIZER SMOOTH WITH SAND- ER BLOCK. BUILD FIN IN THE IE MANNER AS THE STABILIZER.

20



CUT FILLET PATTERN FROM CARDBOARD OF APPROXIMATELY POSTCARD WEIGHT. GLUE TO FUSELAGE AND WING AS SHOWN.

BUILDING PROCEDURE ★

21

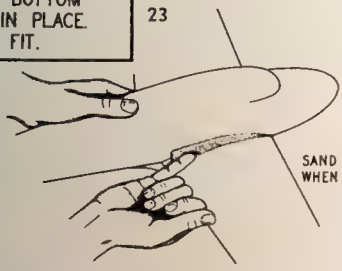
ON LOW-WING MODELS, TRIM FUSELAGE UNTIL IT FITS WING AIRFOIL. THEN GLUE WING IN PLACE.

22

FILL IN SAW CUTS WITH THIN WOOD SHEETS AND SAND SMOOTH.

ON MID-WING MODELS, REMOVE BOTTOM SECTION. FIT AND GLUE WING IN PLACE. THEN TRIM BOTTOM PIECE TO FIT.

23

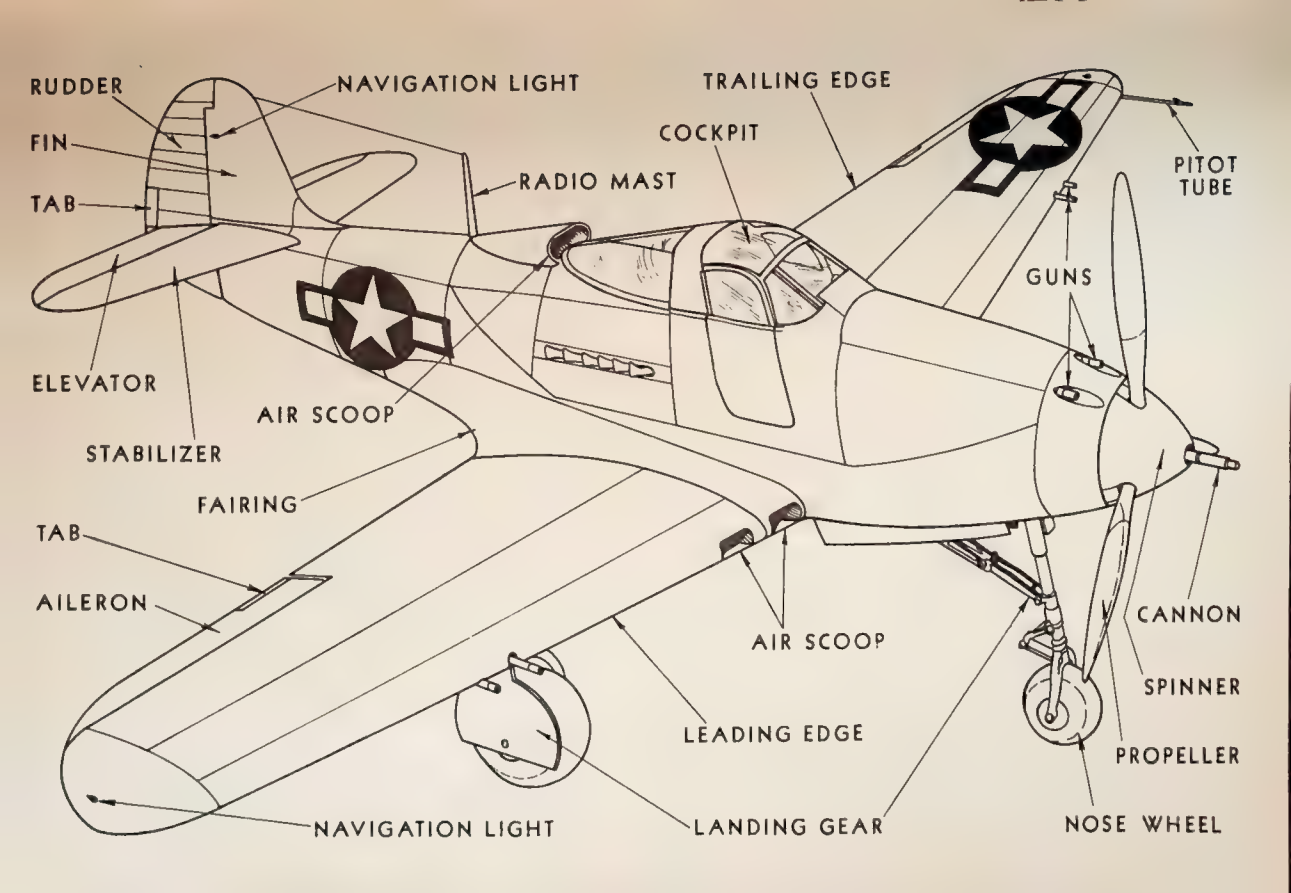


SAND SMOOTH WHEN DRY.

SHAPE PLASTIC WOOD OR OTHER FILLET MATERIAL TO FORM TOP OF FILLET AS SHOWN. IF FILLET IS LARGE, BUILD UP WITH SEVERAL APPLICATIONS.

24 ★

★ *See* How to Obtain Real Finish Page 8


RUDDER
FIN
TAB
NAVIGATION LIGHT
RADIO MAST
TRAILING EDGE
COCKPIT
PITOT TUBE
GUNS
ELEVATOR
STABILIZER
AIR SCOOP
FAIRING
TAB
AILERON
AIR SCOOP
CANNON
SPINNER
PROPELLER
LEADING EDGE
NAVIGATION LIGHT
LANDING GEAR
NOSE WHEEL

SEVERSKY P-35 *(Page 33, top)*

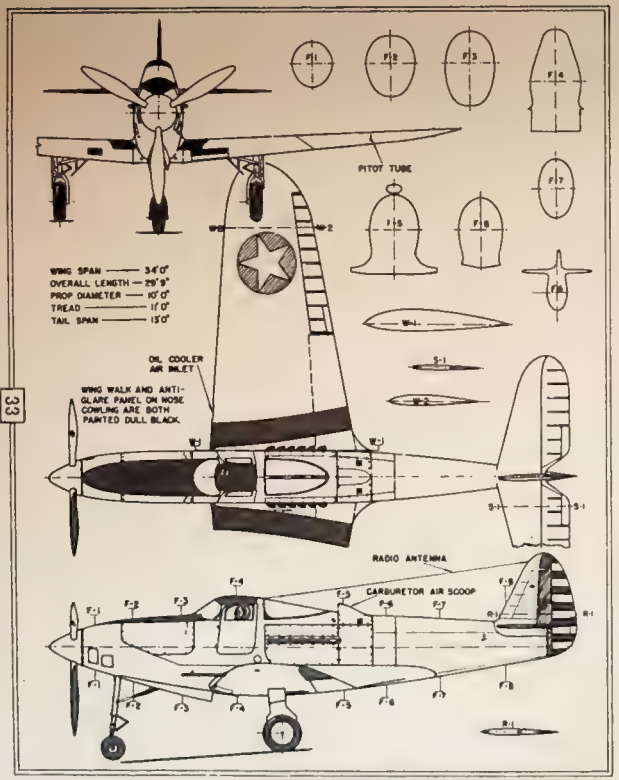
In the years before this war, combat planes of the United States Army were almost always a polished aluminum. Squadron insignia were brightly painted, tail assemblies always carried the bright red and white striping shown in the three view. In fact it was not even amiss to stripe-paint the cowl. The red circle was still in the center of the white star. This single place pursuit plane is of that remembered era of dreamland warplanes.

The Seversky P-35 is now of course obsolete but it had a good start toward what we now call streamlining. It boasted a tail wheel which was completely retractable. There was a streamlined house for each wing into which fitted the wheels. The wheels extended from the fuselage for about half their diameters in the retracted position. There was a 1020 horsepower Wright Cyclone "G" engine, housed in a streamlined cowl and there was beautiful fairing of the wing into the fuselage

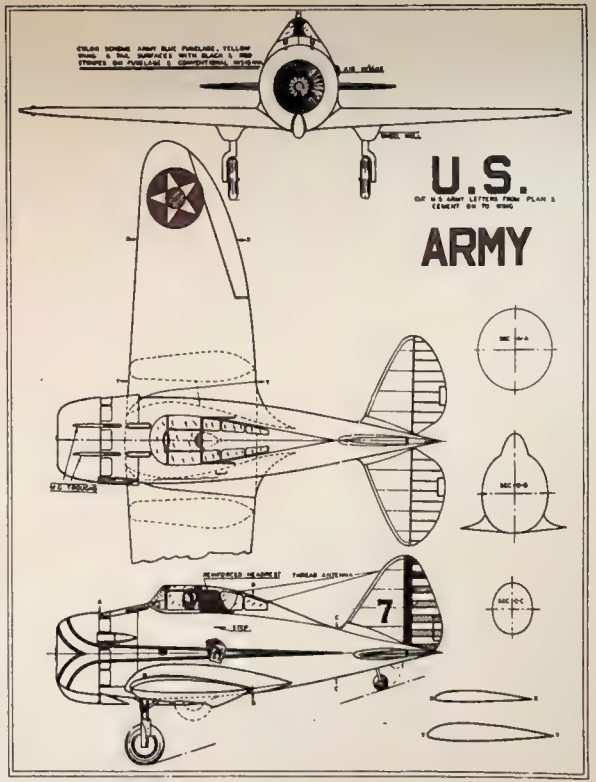
A 10 foot, 6 inch, three bladed Hamilton propeller was synchronized with the twin machine guns in the cowl which fired through it. The plane had a wingspan of 36 feet, an overall length of less than 25 feet, 6 inches and was equipped with radio.

BELL P-39C AIRACOBRA *(Page 33, bottom)*

The Airacobra is very unusual in that it was designed and built around a 37-mm. cannon which fires through a hollow propeller hub. It is a small fighter plane with a wing span of 34 feet and is just three inches short of a 30 foot length. Its loaded weight is less than 7,400 pounds. And yet, despite its size, it carries two machine guns in each of its wings and fires two more between the whirling blades of the propeller. It is a single seater plane with the 1150 H. P. liquid cooled Allison engine located behind the pilot and driving the propeller by means of a ten foot extension shaft. At the present time of writing we understand that it is no longer being manufactured for Great Britain or for ourselves, but is being expressly built for our Russian Allies, who admire its low altitude tank busting abilities.


PITOT TUBE
WING SPAN —— 34'0"
OVERALL LENGTH —— 29'9"
PROP DIAMETER —— 10'0"
TREAD —— 11'0"
TAIL SPAN —— 13'0"
OIL COOLER AIR INLET
WING WALK AND ANTI-GLARE PANEL ON NOSE COWLING ARE BOTH PAINTED DULL BLACK
RADIO ANTENNA
CARBURETOR AIR SCOOP

BELL P-39C AIRACOBRA



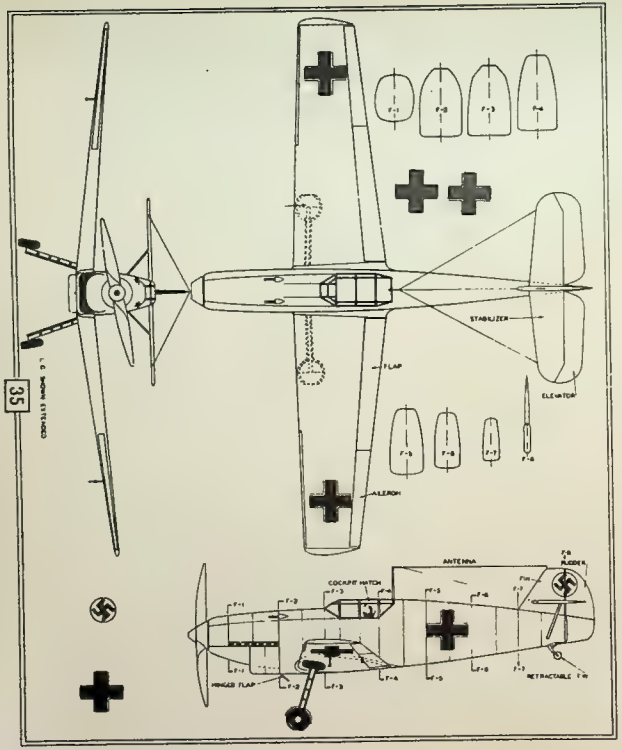
SEVERSKY P-35

GRUMMAN F4F-4 WILDCAT *(Page 35, top)*

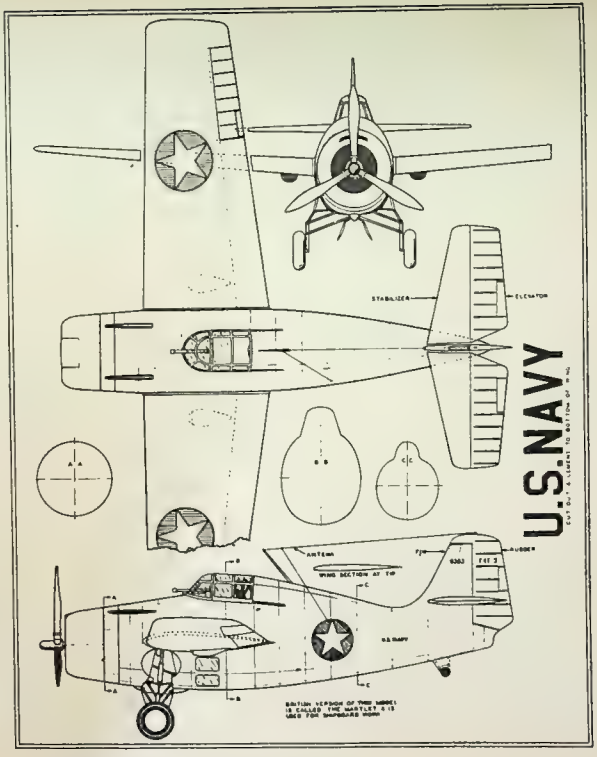
The U. S. has recently announced a new shipboard fighter, the Hellcat, which resembles its little sister, the Wildcat, but which is larger and much improved in performance and power. And yet possibly no plane can ever detract from the superb performances of the stubby Wildcat, for its shot-down score of 5 to 1 over the Japanese in the Pacific is a grand tribute in itself. It's a midwing plane, a single seater, and its Pratt and Whitney Twin Wasp engine develops 1200 H. P. as does the Wright Cyclone which is also used by the Cats. This horsepower gives a top speed of 330 M. P. H. From four to six .50 caliber machine guns are fixed forward in the wings outside the propeller arc. It can and sometimes does carry small bombs under its wings. Its span is 38 feet, its length just short of 29 feet, its service ceiling is about 35,000 feet, its loaded weight is less than 5,900 pounds, and its stubby build has enabled it to maneuver so quickly and well, as to make aces out of many sailors and marines who have flown it in the South Pacific war zone.

MESSERSCHMITT Me. 109 *(Page 35, bottom)*

So quickly does aircraft develop during wartime that an original model of just a few years ago has usually had at least five or six major changes in firepower and engine power output. This tiny German fighter originally carried one 23-mm. shell-firing gun operating through the propeller hub and four 7.7-mm. machine guns, two of which were on the fuselage, synchronized to fire thru the prop, and two on the wings. It sped along at 354 M. P. H., but can do better now, in later versions. It is small by modern standards and seems to have a very fragile landing gear assembly, which is fully retractable even to the tail wheel. Its Mercedes-Benz DB.601 engine, developing 1150 H. P. is powerful for the plane's small size (span 32 feet, length 32 feet). The Me. 109 has a cruising range of 621 miles, and is a high flyer, with a service ceiling of 36,000. Absolute ceiling is greater of course. There is provision made to carry four 50 kg. bombs in external racks which are on the wings. The late Messerschmitts and the Focke-Wulf 190 fighter, form the backbone of the Luftwaffe fighter force which is rapidly dwindling under the sheer weight of increasing Allied air power.



MESSERSCHMITT Me. 109



GRUMMAN F4F-4 WILDCAT

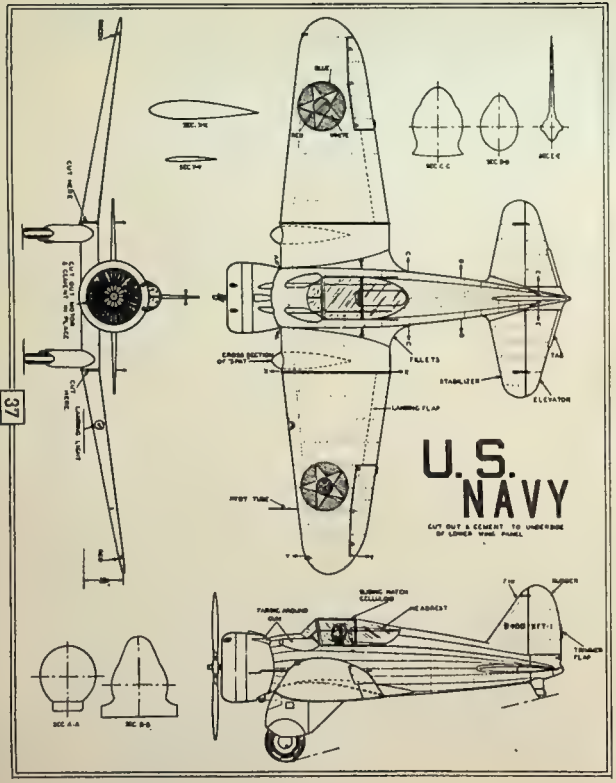
HEINKEL He. 112 *(Page 37, top)*

Not many copies of this unusual plane were built before it was replaced by a model designated He. 113, yet its design is worth noting. It is about 8 inches longer than it is wide, i. e. span little less than 30 feet, length 30 feet, 6 inches. Therefore it is a small, single seater. Its gross weight is only 4,950 pounds. Yet its Junkers "Jumo" engine which develops 700 horses at 2700 R. P. M. carries it to a cruising range of 528 miles with a high speed clocked at 317 M. P. H. It has a service ceiling of 31,000 feet plus. Its elliptic wing reminds one of Great Britains' Spitfire. This little plane lacked adequate firepower to keep it in the modern battle sky. Two machine guns, one mounted on either side of the fuselage, fire through the propeller, and one machine gun is mounted on each wing beyond the propellers' arc. An improved version, the He. 112U gained the first German absolute speed record of 463.6 miles per hour. This plane of course carried no extra equipment such as armament but was built for its speed.

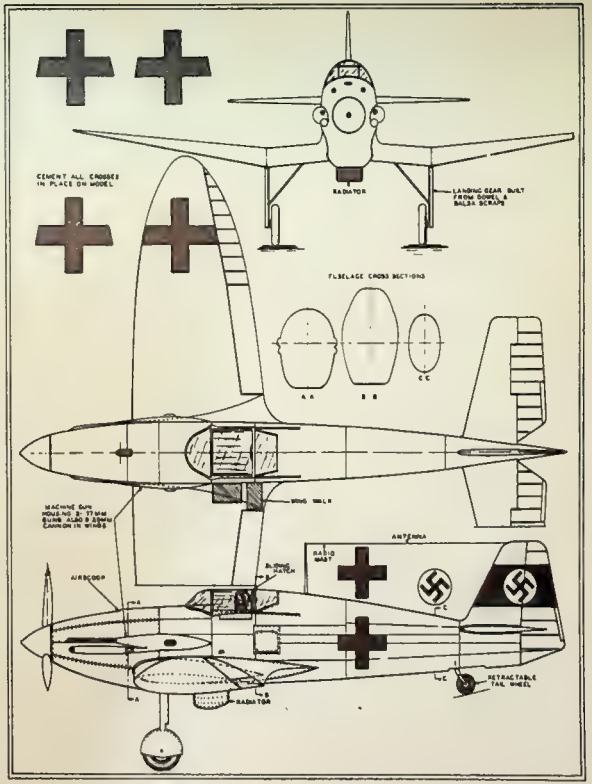
NORTHUP XFT-1 *(Page 37, bottom)*

This United States Navy experimental type airplane deserves attention insofar as it shows a decided trend toward streamlining and modern details and yet shows its age unmistakably. An airplane manufacturer builds a plane according to specifications given him in advance by the Navy as to what they desire in the unborn design. This plane was the result.

It possessed a 14 cylinder, twin row Wasp radial engine which was completely encased in a streamlined cowling which faired directly into the fuselage. Streamlined metal "pants" halfway covered the landing gear and wheels which were not retractable. Even the tail wheel was partially housed in a metal cover. Fuselage and wings were of metal construction. Landing lights, pitot tube, navigation lights and low wing all attest to its modernity. About 30 feet wide and 20 feet long, this single place fighter type had faired-in machine guns (two Browning guns) which fired in synchronization with the two bladed propeller, as did older-type planes. Overall height approached 10 feet. The color of this model which never reached full production was entirely gray, trimmed black.



NORTHRUP XFT-1


CEMENT ALL CROSSES IN PLACE ON MODEL
RADIATOR
LANDING GEAR BUILT FROM DOWELS & BALSA SCRAPS
FUSELAGE CROSS SECTIONS
MACHINE GUN HOUSING & 37 MM GUNS ALSO 2 20MM CANNON IN WINGS
ANTENNA
RADIO MAST
AIRSCOOP
RADIATOR
RETRACTABLE TAIL WHEEL

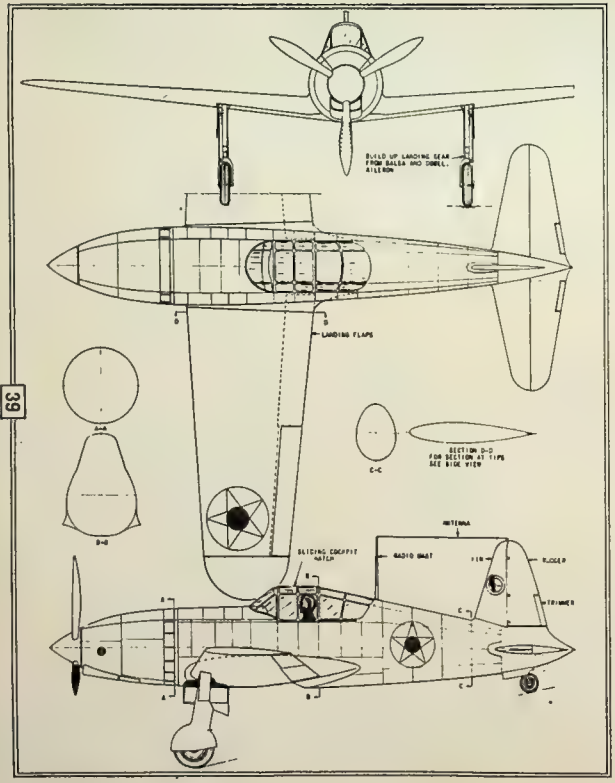
HEINKEL He. 112

SUPERMARINE "SPITFIRE" *(Page 39, top)*

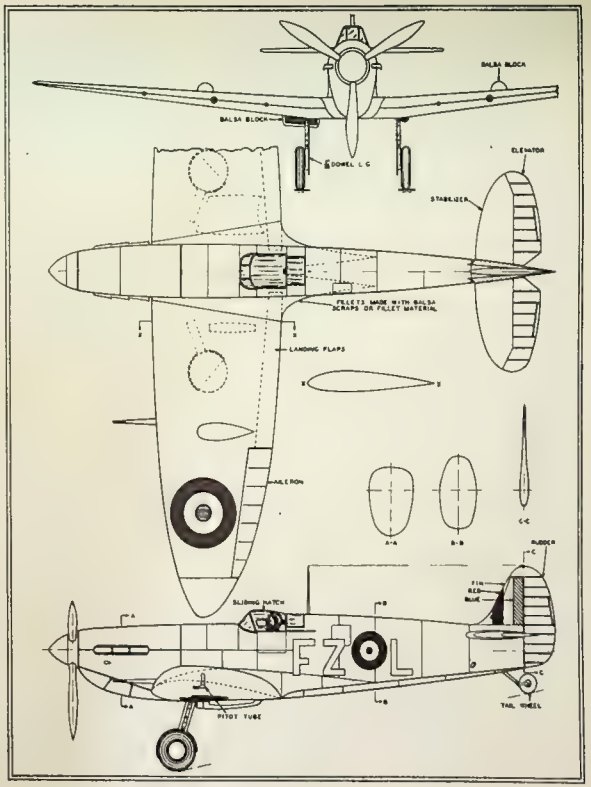
'Spitfire" and "Seafire" are now not only names known to every Englishman, but to every ally and enemy alike. In the darkest hours in Britains' modern history the "Spit" was among those few fighter types which kept the torch glowing. Since then have come later, more heavily armed and powered, faster types. Instead of "Spitfire I", we read of "Spitfire IX and the "Seafire" for carrier duty. Photos are shown of these later models but specifications are secret. Our three views however, show an earlier model with the specs. complete. Judge for yourself the subsequent improvements. A small single seater, day and night fighter. Span 36 feet, 10 inches, length one inch less than 30 feet. Gross weight was only 5,900 pounds. Of all metal construction with full equipment including blind flying instruments. Top speed in this early bird was 367 M. P. H. at 18,400 feet. Its all-important interceptor's rate of climb is 2,291 feet a minute! This plane is powered by a Rolls-Royce Merlin engine developing only 990 H. P. at 12,250 feet. Armament on the "Spit I" was eight machine guns in the wings, the "V" has 2 cannon and 4 machine guns, the "IX" probably even greater armament.

VULTEE VANGUARD *(Page 39, bottom)*

When one looks at the various design features of our fighter craft he perceives that certain trends of thought govern our engineers while they work. The Vanguard was to be a very streamlined air-cooled fighter, so its engine, a Pratt and Whitney 1200 H. P. Twin Wasp, was placed far back in the fuselage and it rotated the propeller by means of an extension shaft. This of course pushed the cockpit back several feet which makes for more difficult landing. The plane had a rather narrow wing which spans 36 feet. It was 28 feet long and about 9 feet, 5 inches in height. It speeded along at about 350 M. P. H. and carried from two to eight machine guns. It weighed about 6,000 pounds when loaded. Besides this data there is little that can be said. Models were scheduled for export delivery to the air force of Sweden but the shipment was suddenly cancelled by the State Department. The plane can be said to be more or less of a mystery for although it was publicized well when it first was built it has disappeared from the sky scene. There is a new Vanguard which went into production in early 1942. It has a radial engine and is not the same as above.



VULTEE VANGUARD



SUPERMARINE SPITFIRE

MONOCOUPE *(Page 41, top)*

The Monocoupe has a distinct place for itself in this book, for of thirty five plans shown on these pages, this plane alone is not for battle. It calls to mind the days of peace which are gone and yet are coming again, when planes of this type buzzed across the summer Sunday skies, bright with color. Shall we not say that the Monocoupe is a representative type therefore?

It is a private and commercial two place craft whose wingspan is but 32 feet, whose overall length is 20 feet, 6 inches, and whose height is only 6 feet, 11 inches. She carries a useful load of 650 pounds and has a gross weight of 1610 pounds, which includes 28 gallons of gasoline. This is truly light in comparison with military planes of comparable dimensions Of course the fuselage is fabric covered and the wings are of wood construction fabric covered.

The engine is a Lambert R-266, which develops 90 H. P. at 2375 R. P. M Cruising range is 600 miles, absolute ceiling 18,000 feet, service ceiling 16,000 feet. Maximum speed approaches 130 M. P. H. The plane also cruises at 110 M. P. H. using 67% of its power, and lands at a neat 40 M. P. H. with flaps. With side by side seats, baggage compartment, and simple instrument panel, the Monocoupe resembles an automobile, but a winged one.

HEINKEL He. 51 *(Page 41, bottom)*

This trim looking biplane with bell-mouthed exhaust stacks, streamlined wheel pants and two bladed propeller is one of Germany's earlier warplanes in use before the present major war. It was another of the Nazi planes tried in the Spanish Civil War of a few years ago. It is used according to report as an advanced trainer for the eaglets of the Luftwaffe It has been replaced by the Heinkel He. 112 which you have read about a few items previous to this. It is not a very large plane but it attains a speed of 200 M. P. H. or more. Its power plant is a BMW engine which develops the maximum of 750 horsepower. The top wing has a span of 36 feet, overall length is 27 feet, 6 inches. The gross weight of the He. 51 is listed as 4,180 pounds. While the three view drawing does not show them, we have reports which claim armament of two machine guns in the cowl which fire in synchronization with the propeller blades, and two machine guns in the wings which are outside the propellers spinning radius. This single seater is of course out moded now but it is representative of the warplane of the recent past.

NC13172
CUT OUT LETTERS & CEMENT TO LOWER LEFT WING PANEL
SEC A-A
SEC B-B
SEC C-C
PITOT TUBE BAMBOO PIANO WIRE
INSTRUMENT BOARD CUT OUT & CEMENT TO "C"
ROCKER ARM HOUSING
COLOR SCHEME MODEL IS PAINTED ALL YELLOW EXCEPT LEADING EDGE OF WING, LEADING EDGE OF RUDDER STRIPE ON BODY & PANTS WHICH IS RED, DETAILS BLACK. ROCKER ARM HOUSING RED
CUT FOR DIHEDRAL
CUT FOR DIHEDRAL
STRUT FAIRING
BAMBOO OR PINE STRUTS
BUILD UP MOTOR OR CUT OUT & CEMENT TO COWL
PROP FRONT VIEW
STEEL OUTER RIM
PULLEYS
CUT OFF SECTION OF WHEEL & CEMENT TO TUNES
FIRST BRUSH RED LACQUER OVER THESE STRIPES THEN CUT OUT & CEMENT TO EACH SIDE OF FUSELAGE
211

HEINKEL He. 51

MONOCOUPE

CURTISS P-40 FLYING TIGER *(Page 43, top)*

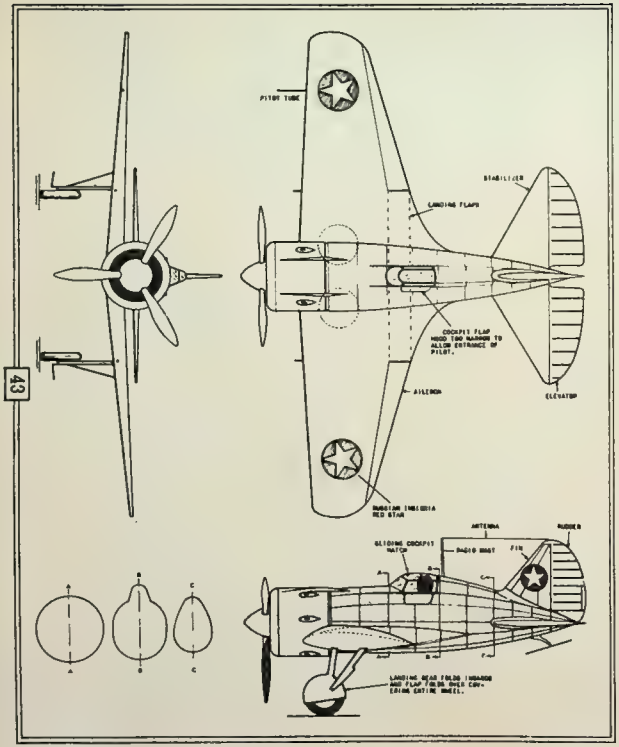
Long months before the United States ever became involved in the fighting part of the war, there were a group of young American dare-devils who worked with P-40's under the pay of the Chinese government for enormous monthly salaries. Under the direction of General Claire Chennault they outflew the numerically superior Japanese to the tune of at least 5 to 1 planes shot down. Because of the wicked ingenuity they possessed in full measure, they painted gaping shark mouths in brilliant colors on the fuselage.

The Japanese learned to fear this American voluntary group (AVG) as not even the Stuka was feared in Europe. Outnumbered as they were, the P-40's flew into Jap formations and because of superb teamwork always came out ahead. In a land of poor equipment, and makeshift alterations, the Curtiss plane deserves full credit.

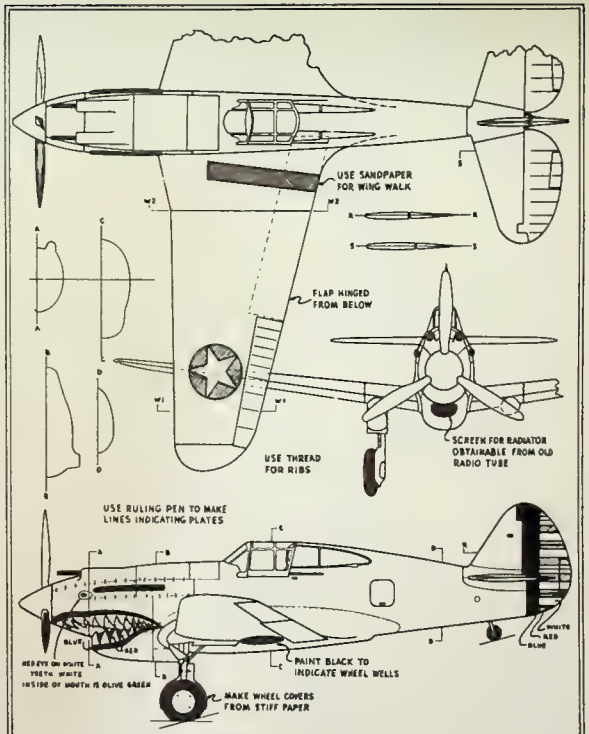
Its wingspan is 37 feet, 3½ inches, length 31 feet, 8½ inches. It is powered by the famous Allison V-1710 engine of 1090 horsepower. Its landing gear folds back into the wing. Machine guns fire thru the propeller. Its pilot was unable to turn as fast as the Japs but he usually outmaneuvered or outsped him nevertheless. The flying tiger group now serves as a regular part of the United States Army Air Forces in China and Burma.

I-16 MOSCA *(Page 43, bottom)*

As is the case with the other Russian plane shown in three views in this booklet the information we have is sketchy and somewhat confused. The "Mosca," sometimes called the "Rata," has an interesting background. During the Spanish civil war a few years back, the Russians, Italians and Germans fell in with the fighting Spaniards in order to "test" some of their own fighting equipment. The Russians sent this tiny plane to the front and it saw action with the Republican air force. As a result, its nicknames "Mosca" and "Rata" are both Spanish not Russian. It was the first Russian low winged monoplane. Standard armament was four machine guns. Its fuselage was wood structure. Top speed about 250 M. P. H. Service ceiling over 30,000 feet. Its engine was an M-25 Wright Cyclone developing 750 horsepower. It was very small by modern standards, spanning about 29 feet with an overall length of approximately 20 feet. The I-16 is now obsolescent, being replaced by B and C versions which no doubt carry more armament and develop greater horsepower.



RUSSIAN I-16 MOSCA


USE SANDPAPER FOR WING WALK
FLAP HINGED FROM BELOW
USE THREAD FOR RIBS
SCREEN FOR RADIATOR OBTAINABLE FROM OLD RADIO TUBE
USE RULING PEN TO MAKE LINES INDICATING PLATES
PAINT BLACK TO INDICATE WHEEL WELLS
MAKE WHEEL COVERS FROM STIFF PAPER

CURTISS P-40 FLYING TIGER

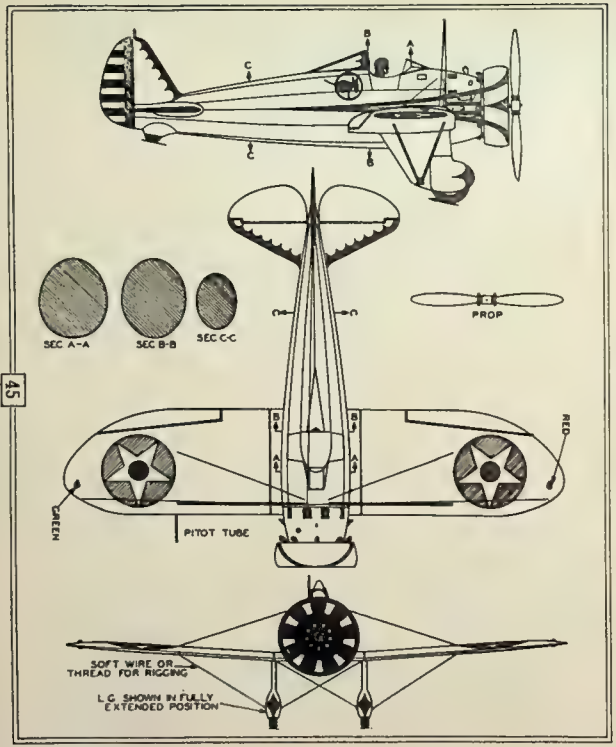
CURTISS HAWK P-6E *(Page 45, top)*

This plane is one of the early pursuit types used by the United States Army in the late twenties. It is quite modern in many respects, for it can boast of an auxiliary gasoline tank, a telescopic gunsight, three bladed propeller, and streamlined wheel housing. We would frankly appreciate any really definite, authoritative information we might get from our readers on this model however, for extensive recent research has unearthed just the few following facts and surmises on our part.

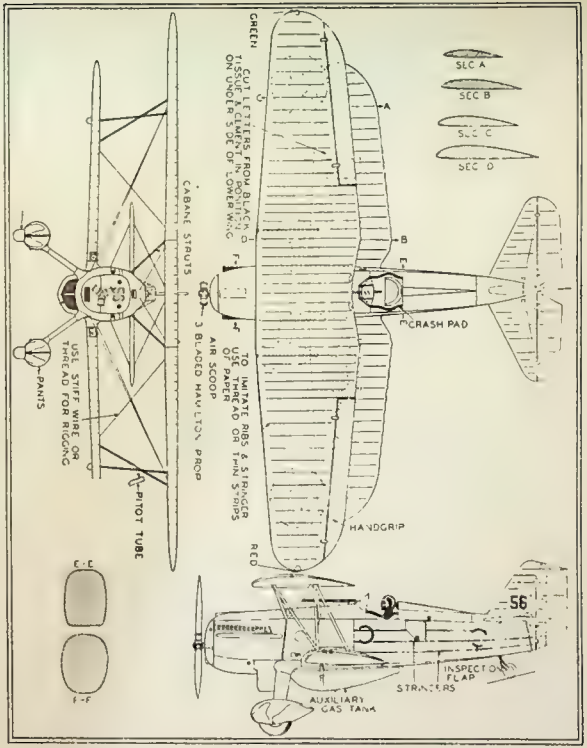
This biplane was evolved in or about the year 1929. Its power is supplied by an engine of unspecified manufacture, with a horsepower output of 625 H. P. The wings and rear fuselage are all fabric covered. Apparently two machine guns fired through the whirling propeller blades. Wingspan is about 31 feet, overall length is about 22 feet. The top speed, cruising range, maximum ceiling, service ceiling, tank capacity, exact armament, dimensions, and engine make, therefore, seemed to be completely beyond our reach at date of publication. We have no doubt that some reader will scoff quietly and produce in a few moments what we have vainly sought for several days. Let us hear from you.

BOEING P-26A *(Page 45, bottom)*

This small pursuit plane served duty during the period from 1932 to 1937 in the Panama Canal Zone and the Hawaii area. It was an army fighter type with olive drab fuselage and bright yellow wing and tail assembly. It was a radical departure from the usual army craft, for it was the first combat type to be a low wing monoplane. It was powered by a Pratt and Whitney Wasp engine which developed 500 horsepower, and could climb to 18,000 feet in ten minutes. Its service ceiling was 27,400 feet which was excellent considering that the P-26A is now obsolete. It was a small plane by modern standards, yet its top speed was 232 M. P. H. Its loaded weight was slightly greater than a ton and a half. Wingspan was 28 feet. Length overall reached slightly less than 24 feet. Height was 10 feet, 5 inches. The landing gear was housed in streamlined "pants" which of course did not retract. The lone aviator sat at an open cockpit. Armament data is difficult to obtain, though it probably consisted of machine guns firing through the propeller.



BOEING P-26A



CURTISS-HAWK P-6E

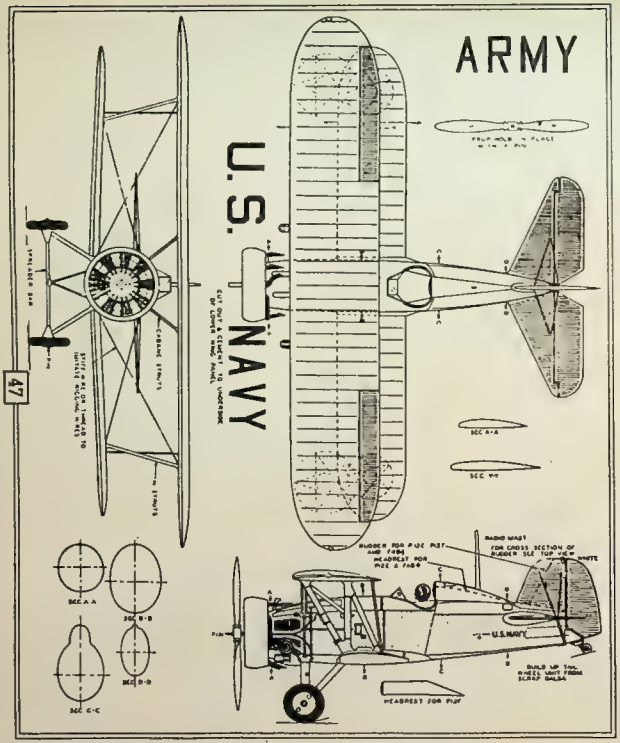
BREWSTER F2A-3 BUFFALO *(Page 47, top)*

Just a very few years ago this short and stubby navy fighter saw action with the British and the Dutch in the near East, with the Dutch in the far East, and with the Finns in their pre-war clashes with Russia. And yet so rapid has been U. S. plane improvement that the Buffalo is now obsolete, except in some cases where it is used for training in our own country. It carried one .50 cal. machine gun in each wing, while two more .50's each fire through the propeller. Under its wings it carried two 100 pound bombs to boot. With a 1400 mile range and a speed which approached 340 M. P. H. it was not a plane to grin about. It was only 35 feet in span, and 26 feet long but its Wright Cyclone radial engine developed 1200 H. P. at 15,000 feet. We have come far in our design of shipboard navy fighters to have caused such a formidable "peanut" to become obsolete within a decade of time.

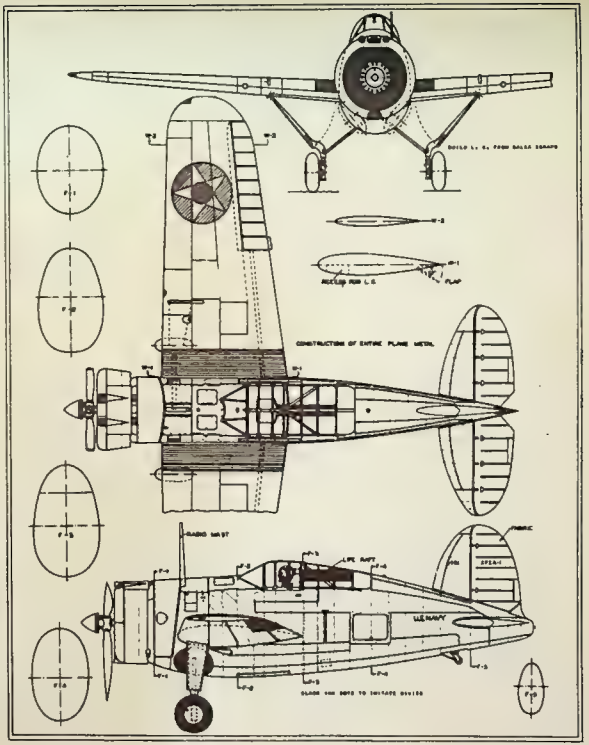
BOEING F4B4 *(Page 47, bottom)*

The F4B4 and F4B3 were Navy planes. The P12E was a U. S. Army pursuit. They were all identical except for code numbering, color scheme and minor detail changes in the streamlining of the pilot's headrest and the shape of the rudder area. This small biplane had the "N-shape" struts which were the result of the design of the Fokker in World War I. It had a narrow cowl ring which streamlined its Pratt and Whitney Wasp engine of 500 horsepower. Its landing gear was reminiscent of the war for it did not retract and had an axle, or spreader bar. It had a two bladed propeller through which two Browning machine guns blazed. It was modern enough, however, to boast of small bomb racks on the under side of the lower wing. It spanned almost 30 feet and was about 21 feet long.

For its day it had a sizeable landing speed of 61 miles per hour. Its top speed was greater than 185 M. P. H. and it climbed at a goodly pace of 1980 feet per minute. It was one of the earliest planes to use radio equipment.



BOEING F4B4



BREWSTER F2A-3 BUFFALO

SPAD 13-C1 *(Page 49, top)*

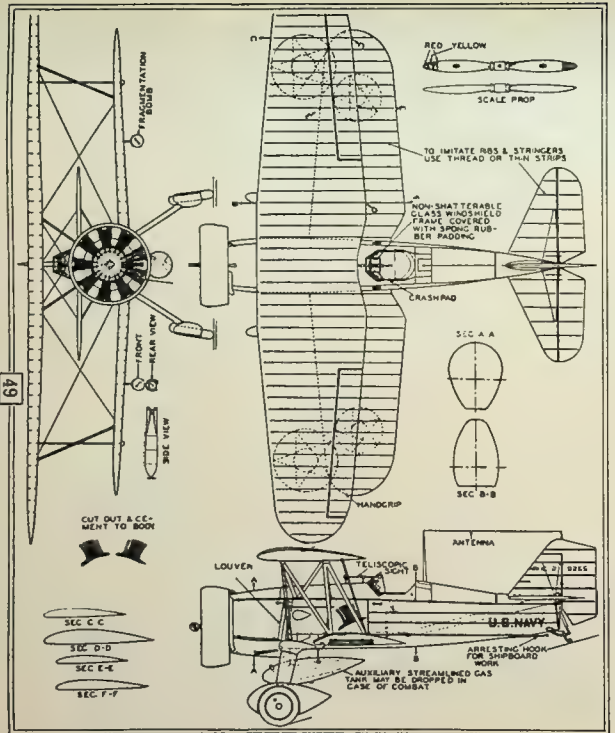
The spad was one of the superior fighter types which flew in the first world war. It has a special claim to fame, for a young man named Colonel Eddie Rickenbacker was officially credited with twenty six victories over enemy planes, a record which has been equalled by two flyers in this war, but which has not thus far been surpassed. Rickenbacker flew a Spad 13, which displayed the famous hat in the ring insignia on its fuselage. It was a plane similar in many respects to others of the war in that its two guns were synchronized to fire through the propeller. It was a biplane, its landing gear had the conventional spreader bar, its exhaust stacks ran along the fuselage past the open cockpit, and it had a tail skid not a tail wheel. From the side its tail assembly was strictly War I, but from above the tail was rather modern in shape. The Spad had a fairly powerful engine, a Hispano-Suiza of 220 H. P. which gave the plane a maximum speed approaching 135 M. P. H. Its slightly wider top wing spanned 26 feet, 10 inches, while its overall length was 20 feet, 8 inches. The plane stood at 7 feet, 6 inches, not much higher than an ordinary man. It carried the insignia of the United States on its wheels.

CURTISS GOSHAWK *(Page 49, bottom)*

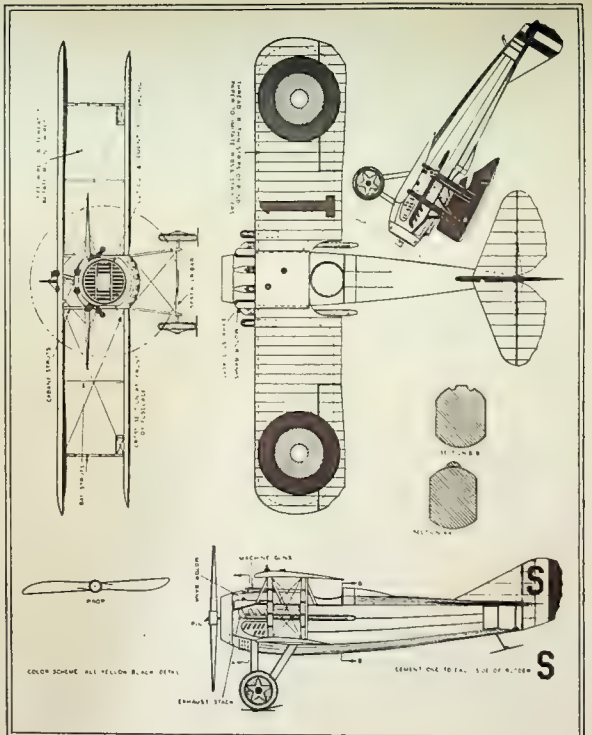
It is discouraging in some cases in this booklet, to report that due to wartime restrictions certain specifications of a particular plane are not obtainable for publications. On page 44 we were frank to admit however, that somewhere in history we had lost the specifications of the Curtiss Hawk P-6E. We admit to the same uselessness in this case.

The Curtiss Goshawk was an early Navy fighter, but was equipped with an arresting hook for carrier landing, it had partially covered wheels, housed in streamlined pants, it carried an auxiliary streamlined gas tank and was able to carry small fragmentation bombs on its lower wing. Its pilot, in his open cockpit, was protected by crash pads and he had a radio equipped plane to fly into battle with.

We do not know the power of the radial engine. We are not sure of armament, range, absolute and service ceilings or of the year of the planes development. On this model, too, we will welcome any information. Our own files are fairly equipped with data, and our city's library is among the finest in the country, but until the time this publication was released we had no definite news to impart. Can you help us? We judge the planes' overall length to be about 23 feet and its wingspan to be approximately 31 feet, 6 inches.



CURTISS GOSHAWK



SPAD 13-C1

SOPWITH CAMEL *(Page 51, top)*

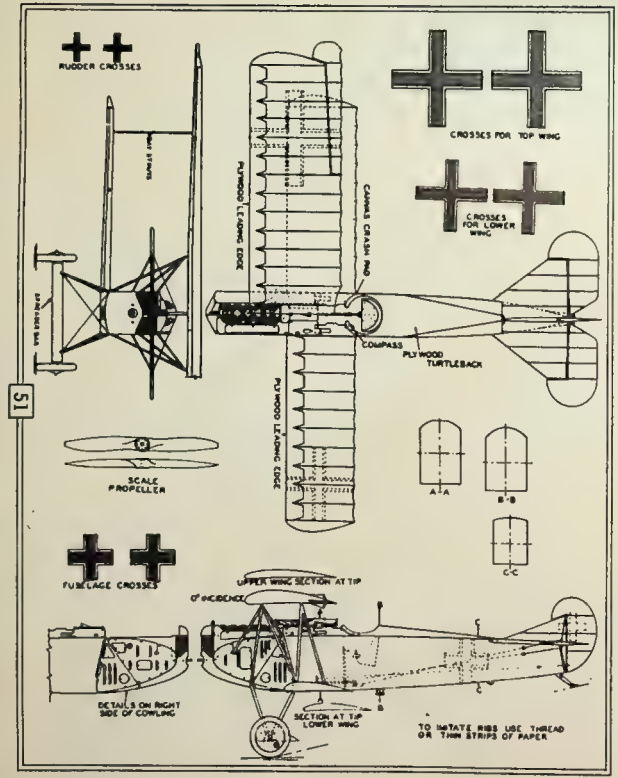
Looking from above, this pursuit plane, which was used by the British Royal Air Force, somewhat resembled the English built SE-5, due to the similarity of the shapes of their respective wings. The Camel, which was a design of T. O. M. Sopwith, was not quite as well armed as the SE-5 however. There are twin Vickers machine guns on the Camel which are synchronized to fire through the spinning blades of the two-bladed, club-like propeller. The SE-5 was no more heavily armed but its movable wing machine gun gave tactical advantages. The Camel made its first appearance on the battle ground of Europe in late 1916 and was used throughout the war thereafter. It is rated as being among the best pursuit ships of the war. Under 12,000 feet it was known to execute the tightest turns of any aircraft aloft, Allied or enemy. It had a radial LeRhone engine which enabled it to climb at a rate of about 10,000 feet in nine minutes. Its top speed was about 120 M. P. H. and it landed at only 35 M. P. H. Its two wings each had a span of about 28 feet while its overall length was only little better than 19 feet.

FOKKER D-VII *(Page 51, bottom)*

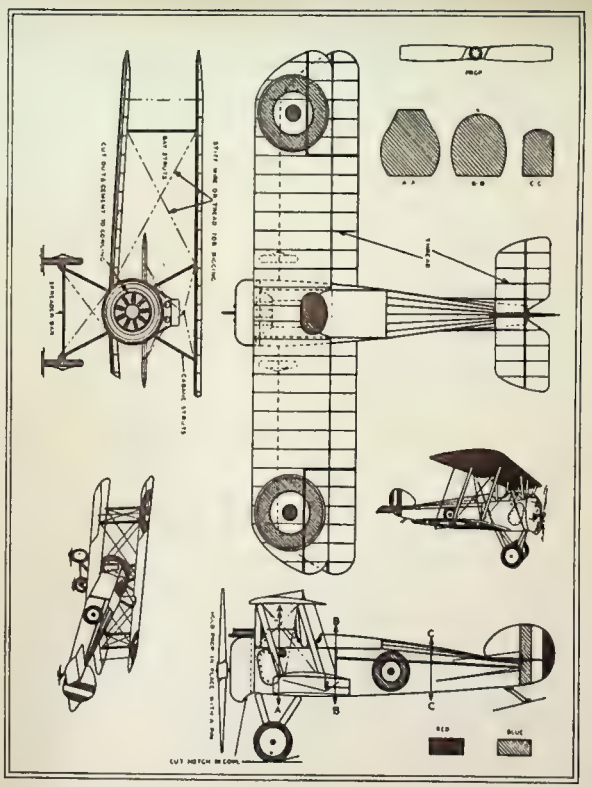
The genius of the German inventor named Anthony Fokker must have been especially evident during the days of the World War I, for the planes he designed were given high ratings even by the air experts in the countries which were his enemies. The plane which succeeded this you will presently read about. It would easily have superseded this Fokker D-VII had not the Armistice been signed.

Until the advent of the D-VIII, this D-VII proudly flew as one of the finest planes of the war, displaying the huge black crosses on its wings of the German Imperial Air Force. It boasted a Mercedes engine which hurled it through space at the speed of 120 M. P. H. which at that time was very fast. It was a single place pursuit type ship which carried two machine guns firing through the whirling propeller. What displayed the inventive genius of Anthony Fokker, however, were the features which were entirely new in airplane design. The D-VII had "N-shaped" struts and the tapering form of wing thickness. It also had the first balanced control surfaces used on aircraft.

Wingspan was about 28 feet while overall length exceeded 22 feet. As with other War I crafts there was the spreader bar for landing gear and tail skid.



FOKKER D-VII



SOPWITH CAMEL

NIEUPORT XVII *(Page 53, top)*

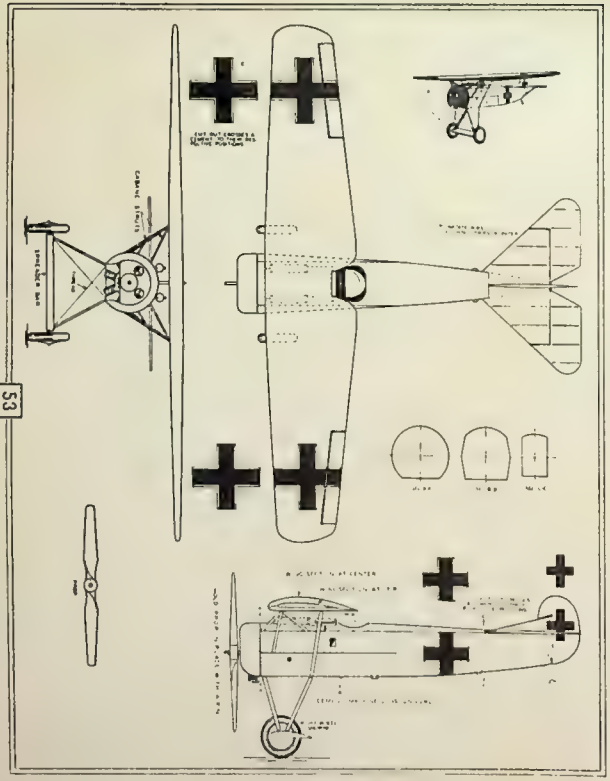
Of all the biplanes which flew over the fields of France in 1917 perhaps the most modern looking of them all would be the Nieuport XVII. It had a rounded rudder of pleasing shape and its wing tips were also nicely rounded while the wings themselves swept back gently from the center. The fuselage cross-sections especially toward the nose were markedly rounded. The wings had graceful "V" struts placed quite well in from the wingtips.

The chassis and landing empennage were steel tubing but wings and fuselage structure were the usual fabric covered wood structures. An interesting insight into construction shows the use of plywood in tail skid assembly and in the forming of the pilot's headrest. It had a French engine, the 110 H. P. nine cylinder rotary Clerget type which gave it an approximate maximum speed of 115 M. P. H.

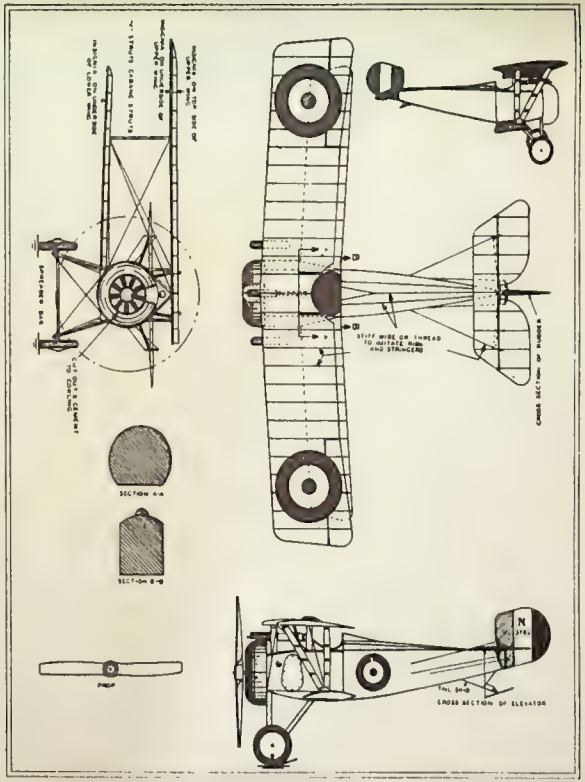
Our three views shows its one synchronized Vickers machine gun, although it sometimes carried a Lewis gun which fired just above the tips of the propeller. Some Nieuports carried both types of guns. The dimensions of this single place pursuit compare closely with the others you have read about. Overall length was a strong 18½ feet. The wingspan was about 27 feet. Overall height approached nine feet.

FOKKER D-VIII *(Page 53, bottom)*

This German warplane was the latest of all fighters designed and produced in the first great World War by any of the combatants. In the expert opinion of all of the military observers, both of the Central Powers and of the Allies, too, it was by far the best pursuit plane to see action in that war. It is very fortunate, perhaps, for the Allies, that only three of these Fokkers got into action, for very shortly afterwards, the armistice was agreed upon. It was an advanced type of fighter, to be sure, for it was a monoplane. All other combat types until that time were either biplanes or triplanes. The D-VIII had a 110 H. P. Oberursel rotary engine which boosted speed to a top of 115 M. P. H. The plane flew higher than four miles upon occasion and climbed at 1500 feet per minute. It spanned about 28 feet, and was a bit more than 19 feet in length. It had an open cockpit, as did all the other fighter types and carried two machine guns which fired shells between the whirling blades of the wooden propeller.



FOKKER D-VIII



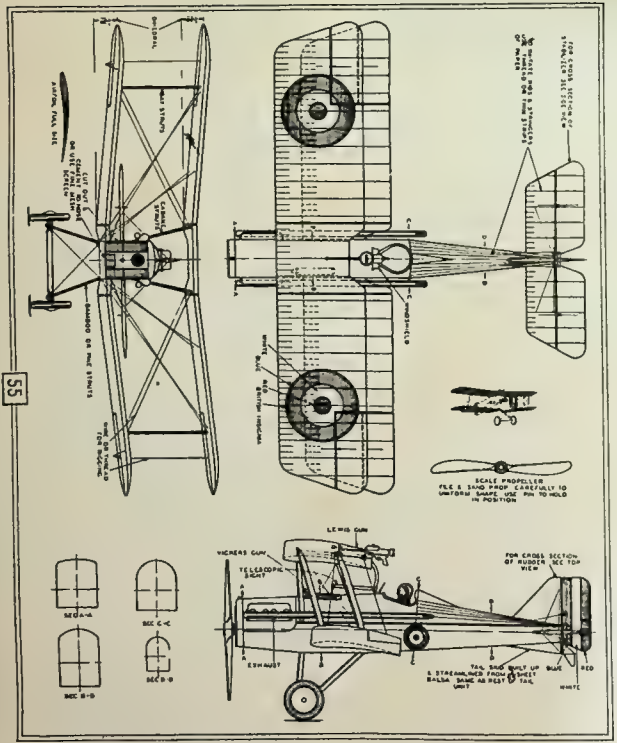
NIEUPORT XVII

SENTO KI-001 ZERO *(Page 55, top)*

This plane, which is quite popularly called Zero, along with all of the fighter planes of the Japanese empire, is in reality not a zero at all. The "Zero" refers to the last digit of the year in the Japanese calendar in which it was built. This model was built a year later. It is useless to claim to know a great deal about this plane. It is known to be wonderfully maneuverable, light in weight, not too heavily armed, and having very little armor protection for pilot, tanks, or engine. It is a very fast plane but on a straightaway race it is outdone by American pursuit planes. It carries an auxiliary gas tank which is dropped during flight when emptied. Being a fighter plane it is a single seater, and has a radial air cooled engine of unspecified horsepower. Its landing gear retracts into the wings. Service ceiling, range, special equipment and armament are unknown to the general public. Its span is reported at 37 feet and its overall length is something more than 25 feet. Since this model was first produced, newer, more formidable Jap fighters have appeared, but the high rate of loss continues, for America has produced improved models, too.

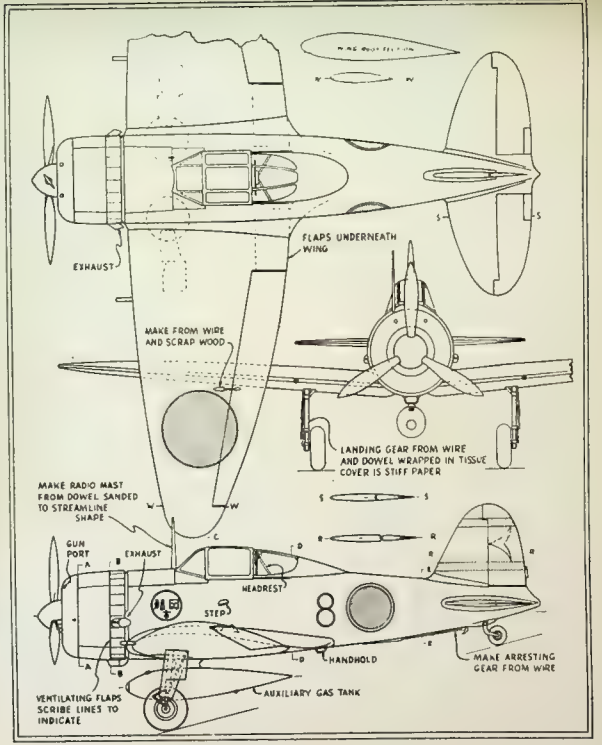
SE-5 PURSUIT *(Page 55, bottom)*

The designation "SE" means scouting experimental. This warcraft was a single seater pursuit biplane used by the British Royal Flying Corps which in 1918 became the British Royal Air Force (RAF). By World War I standards the SE-5 was fast for it was able to fly 100 M. P. H. It spanned about 27 feet and was approximately 21 feet long. Notable design features of this craft were the long exhaust stacks which extended past the cockpit, and the movable Lewis gun of .303 caliber which sat atop the central section of the upper wing and fired above the propeller. A fixed Vickers machine gun fired thru the synchronized propeller blades. Therefore this fast fighter was well armed. Its engine was water cooled, and developed about 200 horsepower. It was manufactured by the Hispano-Suiza Company and spun a two-bladed wood propeller. This plane like other of the first great war, was blessed by a spreaded bar or axle, which saved many a crash when the flimsy planes landed on bumpy fields. In the early planes also it is interesting indeed to note the individualistic designing—especially of wings and tail assemblies.



SE-5 PURSUIT

Kit No. S-24—35¢


EXHAUST
FLAPS UNDERNEATH WING
MAKE FROM WIRE AND SCRAP WOOD
LANDING GEAR FROM WIRE AND DOWEL WRAPPED IN TISSUE COVER IS STIFF PAPER
MAKE RADIO MAST FROM DOWEL SANDED TO STREAMLINE SHAPE
GUN PORT
EXHAUST
HEADREST
STEP
HANDHOLD
MAKE ARRESTING GEAR FROM WIRE
VENTILATING FLAPS SCRIBE LINES TO INDICATE
AUXILIARY GAS TANK

JAP SENTO KI-001 ZERO

USES OF THE SOLID MODEL

On the mantelpieces and photo-covered piano tops of the recent past there often stood a highly lacquered airplane model, product of the skilled youngster of the family. In his room there possibly hung another, slowly turning in the movement of air from the open window, while its owner gazed dreamily from his bed, and longed for the day when he could fly a plane himself.

Today, thousands of young men are fulfilling dreams like that, flying the bullets which we Americans so proudly call our own. But today when he looks at the solid model hanging from the barracks or ward room ceiling, it is always painted a dull black and is devoid of insignia, camouflage, and all the tiny, intricate details which he built into his models when a lad, for the models he looks at are usually of enemy planes. When he sees them from thirty-five feet he sees them as the real enemy looks at a distance of one-half mile. They are built accurately to a scale of 1:72 by boys in high schools the country over, by soldiers of the air in hospital wards when their battling days are halted 'til wounds heal, and by thousands of enthusiasts whose hobby has become a deadly earnest job to perform. Literally hundreds of thousands of these planes have been built for the serious study of the air force personnel, for those who studied willingly as Civilian Airplane Spotters during America's "scare" period, and for the Air Cadets who will fly tomorrow.

These tiny silhouettes, when magnified seventy-two times and travelling hundreds of miles an hour as real planes, give our pilots about one to three seconds to decide whether the plane approaching is friend or enemy. There is real reason why they study without prompting.

When learning to operate the deadly machine guns and cannon in training courses, the gunners of our air forces get a good idea of just how big their moving targets will be when they actually see them move.

And armorers, adjusting those fixed guns in the wings, use them too. Fixed guns all aim at a certain imaginary spot, and woe betide the enemy who manages to get caught where the bullets all meet. These little planes make good targets.

In the plans preceding you will find many of today's planes. They are to scale of one-eighth inch to the foot, but can be photostated to size. Along with them are others, of course, which have no bearing as to this war's course, except to remind us as to the progress of the aviation of wartime and of the new models our men may yet have to study when we have built them.

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USES OF THE SOLID MODEL

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past there often stood a highly l
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AIRCRAFT

FAMOUS PLANES IN MINIATURE